

NAVAL AIR WARFARE CENTER | TRAINING SYSTEMS DIVISION | ORLANDO, FLORIDA

PRODUCTS AND SERVICES HANDBOOK





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NAWCTSD



INTRODUCTION

This Naval Air Warfare Center Training Systems Division (NAWCTSD) Products and Services Handbook is intended to provide you with an overview of the organization, its capabilities, and a few examples of our products.

At NAWCTSD, we have an exceptionally skilled military and civilian acquisition, research and development workforce, that along with our advanced laboratories comprise a center of excellence that produces leading-edge advances in training systems and human performance.

NAWCTSD employs more than 1,000 personnel at our location in Orlando's Central Florida Research Park and at more than 30 field sites supporting the fleet.

Our site in Central Florida gives us the advantage of co-location with other military acquisition, research and development organizations, the University of Central Florida, and close proximity to the center of the simulation-based entertainment industry.

The demands evolving from changes to modern combat, new roles for military operations, and use of high technology weapons systems place increased emphasis on effective and efficient training solutions. It is through the application of technical, business, and leadership expertise that enables NAWCTSD to be continually responsive to emergent military needs by providing systems that enable both readiness and proficiency. We welcome the opportunity to partner with other military organizations, private industry, and academia in meeting the training needs of our nation's Warfighters.

NAWCTSD MISSION

To be the principal Navy center for research, development, test and evaluation, acquisition, and product support of training systems, to provide Interservice coordination and training systems support for the Army and Air Force, and to perform such other functions and tasks as directed by higher authority.

NAWCTSD OVERVIEW

ROLE

Within the Naval Air Systems Command, NAWCTSD is the Navy’s source for a full range of innovative products and services that provide complete training solutions. This includes requirements analysis, design, development and full life cycle support. NAWCTSD provides continuous learning across a wide variety of applications including aviation, surface, and undersea. NAWCTSD integrates the science of learning with performance-based training focused on improving the performance of Sailors and Marines. We continually engage the Warfighter to understand challenges, solve problems, create new capabilities, and provide essential support.

HISTORY



The roots of NAWCTSD reach back to April 1941 when then-Commander Luis de Florez became head of the new Special Devices Desk in the Engineering Division of the Navy’s Bureau of Aeronautics. De Florez championed the use of “synthetic training devices” and urged the Navy to undertake development of such devices to increase readiness. In June, the office became the Special Devices Section.

Throughout World War II, the Section developed numerous innovative training devices including ones that used motion pictures to train aircraft gunners, a device to train precision bombing, and a terrain modeling kit to facilitate operational planning in the field.

The Special Devices Section grew and became the Special Devices Division. In August 1946, the Division, at its newest home at Port Washington, Long Island, New York, was commissioned the Special Devices Center.

THE EVOLUTION

As NAWCTSD evolved and grew, it was aligned at various times under several different parent organizations within the Navy. In 1956, it became the Naval Training Device Center. Over a three-year period in the mid-1960s, the Center moved from its Long Island location to Orlando, Florida. In 1985, the then-Naval Training Equipment Center became the Naval Training Systems Center. The Center moved to its present headquarters building in Orlando, named for its founding father Luis de Florez, in 1988. On October 1, 1993, the Naval Training Systems Center became NAWCTSD, a significant component of the Naval Air Systems Command (NAVAIR). As an echelon 4 command, NAWCTSD reports directly to the Commander, Naval Air Warfare Center Aircraft Division (NAWCAD) headquartered at Patuxent River, Maryland.

THE FUTURE

The roles of the Department of Defense, the Navy, and NAVAIR are changing. Simulation and training will be key to ensuring military preparedness and to adapting to new and changing roles and missions. These changes, coupled with

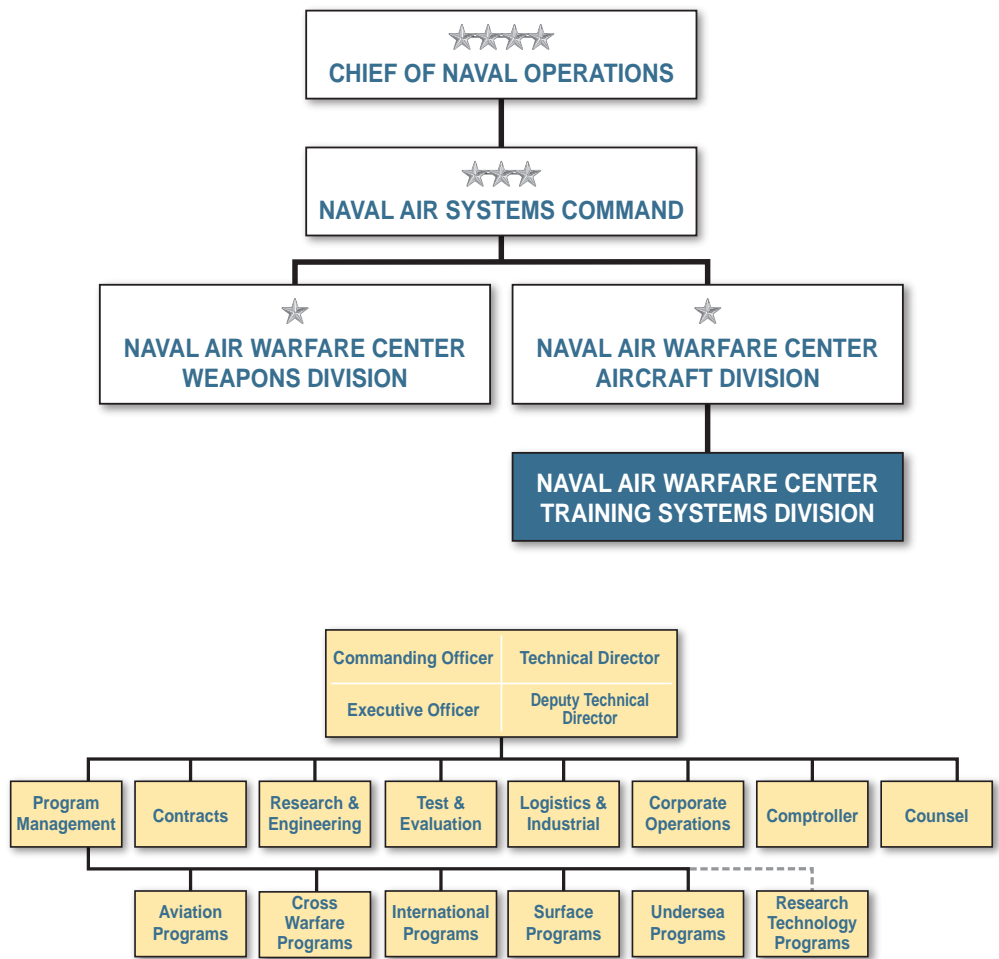
THE NAWCTSD ORGANIZATION

diverse threat potentials in the post-Cold War world, will require innovative approaches to how our military trains.

NAWCTSD will continue to play a vital role in responding to evolving training and simulation needs. NAWCTSD will also continue to work to transfer its products to non-military applications through cooperative agreements.

The command has implemented competency alignment and is now a more efficient organization, allowing the command to continue its high-quality support of customers. Hand in hand with competency alignment, adherence to total quality concepts and best practices will allow NAWCTSD to continue to improve its products and services.

NAWCTSD will play a vital role in maintaining the defense posture of this nation and our allies around the world. Training systems and plans must be developed simultaneously with emerging weapon systems to be prepared for the full spectrum of military operations. The training systems must also be effective and efficient. To these ends NAWCTSD is dedicated.



CAPABILITIES



ACQUISITION

NAWCTSD's acquisition process can be identified by three primary phases; these are:

1. Requirements Analysis
2. Acquisition
3. Support

These processes are described in detail in our internet-based Acquisition Guide, which provides a "one stop" information center on the integrated overall acquisition process at NAWCTSD. The Acquisition Guide provides a macro-to-micro look at these processes. It is accessible to both government and industry personnel as a dual (government/industry) use program.

The Acquisition Guide can be found at:
www.navair.navy.mil/nawctsd/resources/library/acqguide/acqguide.htm

ACQUISITION GUIDE
NAVAL AIR WARFARE CENTER
TRAINING SYSTEMS DIVISION - ORLANDO FLORIDA

This view into our processes covers the entire analysis/acquisition/support process from determination of a training need through life cycle support of a fielded system. The wide dissemination of NAWCTSD processes has three major purposes. The first is to educate our own employees. The second is to inform other government agencies and customers about how NAWCTSD operates. And the third is to inform industry. Anyone using the Acquisition Guide can leverage information provided to further refine their own processes. Access to detailed government processes allows industry, our customers, and NAWCTSD to better position themselves as true partners in an Integrated Product Team (IPT) arrangement.

The acquisition process at NAWCTSD begins with the receipt of a requirement. The requirement can come from many sources. These include: Initial Capabilities Document, Capability Development Document, Capability Production Document, Navy Training Plan, existing curriculum, and many others. That requirement is then categorized as a particular type of work such as new training system procurement, device modification, services, life cycle support, or front end analysis. We then conduct market research, further document the requirement based on the market research, make a commerciality determination, and then propose the acquisition strategy to procure the requirement. Depending on the scope of the program, the following steps will then occur:

- ◆ Develop an acquisition package to include the Request For Proposals (RFP)
- ◆ Evaluate proposals
- ◆ Award contract
- ◆ Conduct design reviews
- ◆ Conduct acceptance testing
- ◆ Establish Ready for Training and Initial Operational Capability
- ◆ Conduct interim and long term life cycle support

ACQUISITION SUPPORT GROUP (ASG)

In 2011, NAWCTSD created the Acquisition Support Group (ASG) as a result of a continuous process improvement initiative. The ASG is a cross-competency enterprise team empowered to provide communication, facilitation, horizontal integration, collaboration, accountability, and process transparency to the acquisition process.



FRONT-END ANALYSIS

The ASG's goal is to achieve process transparency across NAWCTSD at a level that provides enough insight of all work being performed by Integrated Product Teams (IPTs) and associated competency personnel to facilitate continuous process improvement. The objectives of this group include providing detailed status of Work In Process (WIP), improving acquisition knowledge, and increasing internal and external stakeholder satisfaction. The ASG is chartered to maintain key performance metrics which will assist Leadership with facilitating workload acceptance decisions. The Charter also includes responsibility for evaluation of changing processes and policies, and communicating cross competency impacts.

The intent is to provide assistance to IPTs without being intrusive. The group's focus is on metrics, communication, and providing TSD-focused acquisition information on the cross-competency impacts of changes in the organization's policies, instructions, or guidance.

Front-End Analysis (FEA) is a structured process we use to examine training requirements and identify alternative approaches to training job tasks. Using the process, we identify job tasks to be performed, analyze the skills and knowledge needed to perform them, assess the technologies available for training the skills and knowledge, perform a media analysis to recommend the best mix of delivery media, and provide cost and lead-time comparisons for the feasible alternatives.

The purpose of the analysis is to provide the customer with sufficient information to meet training needs within budgetary and other constraints. The analysis offers a recommendation, but also includes a number of options, each with a different training potential and cost estimate. This allows the program sponsor to make sound training decisions based on relevant and thoroughly analyzed data.

Early planning permits us to provide a full range of options, to include embedded training, and to consider the impact operational equipment designs will have on training. Therefore, it is important to consider training needs early in the design of any new weapon system. The FEA documentation forms the basis for the life cycle investment strategy and subsequent system evaluation.

The FEA process can be applied not only to new systems, but also to existing systems which are being upgraded and modified. In fact, whenever there is a training challenge, a change in mission/doctrine, a change to the weapon system, a need to integrate newer technology into the classroom, or to move training from the classroom, an FEA should be conducted to determine whether, and the extent to which, the training needs to be modified.

Training options can vary widely, from computer-based training, to Electronic Performance Support Systems (EPSS), to complex, high-fidelity simulators, to traditional stand-up lectures, and classroom aids. The FEA documentation provides the justification supporting the development/procurement of the selected training solution.

The NAWCTSD In-Service Engineering Offices (ISEOs) provide localized, cost-effective Fleet support of fielded training devices. ISEO personnel assist in keeping training systems current, making fidelity improvements, and implementing the training system life cycle management support plan. They are the front line representatives and conduct valuable liaison work between the Fleet/customers and NAWCTSD.

In-service engineers provide on-site technical and engineering support from concept formulation, to installation, to end of life disposal. They are active members

IN-SERVICE ENGINEERING SUPPORT



LOGISTICS

of the Integrated Project Teams/Externally Directed Teams (IPTs/EDTs) as well as NAVAIR's primary agents for accomplishing on-site trainer modifications and life cycle support. Services include:

- ◆ Trainer Acquisition Support
- ◆ Engineering Change Support
- ◆ General Engineering Support
- ◆ Configuration Management (CM)
- ◆ Fleet Synthetic Training (FST) Support
- ◆ Information Assurance (IA) Support

There are currently 44 ISEOs/~100 ISEs located throughout the United States and Japan.

Logistics involves the coordination and integration of numerous functions into an overall support effort which provides for the life cycle requirements of a Training System.

A system is more than just an end item or a single piece of equipment. It includes operators and maintainers, spare parts, support equipment, facilities, and training. In addition, systems designers are expected to address the system's compatibility with the rest of the support infrastructure. Logistics support begins with early planning for the system and continues throughout its useful life. Reliability, maintainability, and availability parameters are key leverage points in determining the depth and range of logistics support. The process is the same for all items, regardless of whether they are minor or major systems.

The process should emphasize the need to establish a logistics support management team early in the life cycle of a system. Acquisition logisticians work hand in hand through constant and extensive contacts with technical specialists such as systems, software and facility engineers, supply and maintenance specialists, technical data experts, project/program managers, training specialists as well as contract personnel to ensure that logistics support is considered during the design process. Since many military contractors also closely follow this same process, NAWCTSD Logistics Managers' work frequently involves close contact and coordination with counterparts in industry. The NAWCTSD acquisition logistician acts as the central point of contact for the program manager to assist each area in resolving problems affecting support of the training system. The logistics management integrated product team helps the acquisition logistician establish effective support for the system.

The importance and complexity of maintaining weapons systems, to include training systems, at an optimum state of readiness led to the development of a logistics process known as Integrated Product Support (IPS) and the associated IPS elements.

The acquisition logistician must integrate diverse support elements to ensure effective support of a system. Each element must be managed to ensure that the resources needed to sustain operations are available when needed. These elements determine the life cycle costs and the degree of operational readiness of the system after it is fielded. Although each of





these elements may be developed or managed by different individuals or activities, the focal point is the logistician. If properly applied and monitored through the design and production phases of the acquisition process, the twelve IPS elements described below will optimize the supportability of the system over its entire life. The IPS approach to system life cycle sustainment relies on understanding and integrating all the functional components which are available to make up the required product support infrastructure. These functional components are grouped into twelve categories called the Integrated Product Support (IPS) elements. These elements include:

- ◆ Product Support Management (PSM)
- ◆ Design Interface
- ◆ Sustaining Engineering
- ◆ Supply Support
- ◆ Maintenance Planning and Management
- ◆ Packaging, Handling, Storage and Transportation (PHS&T)
- ◆ Technical Data
- ◆ Support Equipment
- ◆ Training and Training Support
- ◆ Manpower and Personnel
- ◆ Facilities and Infrastructure
- ◆ Computer Resources

IPS elements have the word “integrated” specifically included in the name to reinforce the approach of constructing the product support infrastructure to ensure all functional areas are mutually supporting and non-duplicative in terms of funding, usage of resources (both personnel and materiel), capability and outcomes. The term “integrated” is critical. The Logistics Manager must understand how each element is affected by and linked with the others and should employ all of them in an integrated fashion to reach the goal of optimizing Warfighter requirements for suitability and affordability. Each of the elements should become a “force multiplier” to add value (either through improving outcomes or reducing life cycle costs) across the entire scope of training system support. Each IPS element or combination of elements supports the production of a plan, process or specific product which in turn contributes to the successful acquisition, operation and support of the weapon system.

The IPS process is used to assure that the most effective and economical means of support are considered and planned for during all stages of a training system’s life cycle, beginning with its concept and design, extending through research and development, production, transfer to the user, and ending with its disposal. Life cycle sustainment planning and execution seamlessly span this system’s entire life cycle. It translates force provider capability and performance requirements into tailored product support to achieve specified and evolving life cycle product support availability, reliability, and affordability parameters.



The basic management principle of IPS is that logistics support must be developed, acquired, tested, and deployed as an integral part of the material acquisition process, and that these considerations are continued throughout the



RESEARCH & DEVELOPMENT

system’s life cycle. Because a system can be more easily influenced by considerations of support feasibility during the design, research and development stages, IPS work is performed to a greater extent during the acquisition phase of the life cycle. However, the IPS process is also employed during modifications to an existing system as well as planning for and executing maintenance and sustainment once the training system is fielded.

NAWCTSD’s research mission is to plan and perform a full range of directed Research and Development (R&D) in support of Naval training systems for all warfare areas and platforms, to maintain an expanding technology base, and to transition research results to the Fleet. The R&D program emphasis is on Fleet and training command requirements, rapid transition of products, industry/academia coordination, coordination with other services, and improved quality and cost effectiveness of products. Needs for Naval service training systems are generated by new weapon system requirements, by modifications to existing weapon systems, and by Fleet requirements for new training systems and capabilities to satisfy specific training tasks. Thus, the R&D program is balanced among improvements in highly specialized areas of simulation, training methods, training technologies, and providing direct technical support to the training systems acquisition effort to reduce risk and cost.

The majority of the work undertaken constitutes the Technology Base Program and includes exploratory development, where innovative technologies and methodologies are developed, and advanced development, where proof-of-concept is established. Additional efforts include cooperative/collaborative research with other government agencies, non-profit institutions, and commercial firms. Research funds are received from NAVAIR, Naval Air Warfare Center, the Office of Secretary of Defense, Department of Homeland Security, Office of Naval Research, Joint Forces Command, Defense Equal Opportunity Management Institute among many others.

NAWCTSD has a long history of technology transfer to both the public and private sectors. NAWCTSD is involved with the local public school systems, non-profit groups, local, state, and federal organizations, and industry in partnerships to share information and expertise. By sharing Navy training research and development, the public benefits in having improved education and training. The Navy also receives valuable information in the exchange of resources.

SYSTEMS ENGINEERING

Engineers are assigned to specific warfare areas – aviation, surface, undersea, or land – where they develop special experience and expertise. Based on their backgrounds, engineers are selected to provide the engineering expertise required to develop and procure specific training systems.

Their first role is to write engineering specifications for the training system based on analysis of the Training System Functional Descriptions (TSFD) – normally supplied by the Training Analysis, Design, and Evaluation Division – and other known requirements. The information the engineer receives indicates what the training system is to teach and what features and characteristics it is to have. The engineer develops a set of engineering specifications and procurement documents that will enable a contractor to understand what is required in the design and production of the specified trainer and to submit a responsive technical proposal.

Later, the engineer plays a principal role in evaluating the proposals received from offerers. This evaluation allows selection of the contractor (to perform the

MODELING & SIMULATION

contract) that offers the best value. During the development and construction of the training system, the engineer maintains close contact with the contractor to review designs, evaluate progress, and resolve technical and program problems as they arise. The engineer reviews progress and technical reports from the contractor, participates in design review meetings, and visits the contractor's plant periodically for on-site evaluation.

The project manager leads the in-plant acceptance test team when the contractor has produced the trainer. Technical leadership is provided by the project engineer. The team tests the training system to ensure that it complies with equipment specifications and that it will serve the training need for which it was designed. Similar on-site testing is conducted when the training system is installed in the field to ensure that it functions properly in its training location.

The Advanced Simulation, Visual and Software Systems Division, serves as NAWCTSD's central point of expertise relative to Navy and DOD Modeling and Simulation (M&S) initiatives. The division provides technical authority and innovative solutions in a number of key areas including aero/vehicle dynamic modeling verification and validation, visual/sensor simulation, software engineering, software acquisition management, interoperability, distributed simulation, distance learning technologies, and M&S in general. Since the 1990s, the division has had a long history of first-hand experience with DOD interoperability standards and provides both engineering expertise and products to a wide range of customers across all Naval warfare areas. Examples include work with Distributed Interactive Simulation (DIS) and High Level Architecture (HLA). Recent key advances include low-cost Personal Computer (PC)-based simulations using MicroSim technologies and virtual communications technologies including live-to-virtual communication interfaces and bridging technologies between DIS/HLA and telephone standards. Our primary goal is to ensure that our customers and program sponsors are provided with systems that not only meet customer requirements, but also do so efficiently, and in a manner that conforms to the most recent open system architectures and standards. Our knowledge and experience gained through exposure to a multitude of military platforms provides us with a unique opportunity to leverage across the various warfare areas as well as other non-military applications and Federal agencies.



TEST AND EVALUATION

Test and Evaluation (T&E) is an essential component of the acquisition process. Early T&E involvement to plan and develop an efficient and rigorous T&E program provides the results to gain early knowledge of developmental and operational issues. The T&E phases in the acquisition timeline are designed to collect decision quality data to assist decision-makers with managing risks involved in developing, producing, operating, and sustaining systems and capabilities regardless of complexity or cost of the system.

PROJECT MANAGEMENT

The current fiscal environment drives the Navy to innovate and achieve more cost effective means to accomplish training and readiness. This requires a transformation of the T&E strategy to embrace a capabilities-based test approach for the products we deliver. NAWCTSD achieves this by applying robust T&E processes to our acquisition programs to increase the rigor of the planning, execution, and reporting to support the acquisition of training systems from program inception to the certification process. Certification of a training system is the formal technical recommendation by the training system technical authority that the delivered system is capable of meeting the intended training and readiness requirements.

Within the Program Management Competency, NAWCTSD has fully accountable Program Directors (PDs) whose role is to provide focus and advocacy for specific customer and supplier relationships. The PD's responsibility is to provide leadership, direction, priorities, and support to the planning, management, execution, and control of assigned training systems. They champion NAWCTSD's mission and capabilities with the full range of sponsors, customers, and suppliers, and they continually measure, evaluate, and improve the efficiency and effectiveness of the program management processes. The PDs perform their responsibilities primarily through their leadership of Project Managers (PJM) who report directly to them.



COOPERATIVE RELATIONSHIPS



PARTNERSHIPS

NAWCTSD enters into partnerships which offer significant benefits, such as lower costs, collaborative efforts, and development of commercial sources. Lower costs are achieved through cost sharing, expert collaboration, and leveraging of resources including facilities and equipment. Working together allows “re-use” versus “re-development” and joint versus independent development. Development of commercial sources allows transition of Federally-developed technology and uses the strength of the free enterprise system. By pursuing shared objectives, the partners are able to work as a team. For more information contact our Partnership and Technology Transfer Office at ORLO_Orlando_Tech_Transfer@navy.mil or (407) 380-4699. Partnership mechanisms which we utilize include:

- ◆ Cooperative Research and Development Agreement
- ◆ Memorandum of Understanding
- ◆ Memorandum of Agreement
- ◆ Inter-service Support Agreement
- ◆ Interagency Agreement
- ◆ Education Partnership Agreement
- ◆ Commercial Service Agreement
- ◆ Licensing Agreement

TEAM ORLANDO



Team Orlando is a partnership among the military services, industry, and academia working to leverage resources and contribute to the overall security of the United States.



Naval Air Warfare Center
Training Systems Division



Program Executive Office
Simulation, Training and
Instrumentation



Marine Corps
Systems Command
Program Manager
for Training Systems



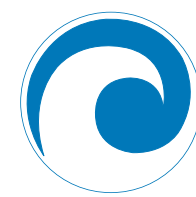
Air Force Agency
for Modeling
and Simulation



Joint Training
Integration and
Evaluation
Center



Joint Forces
Command
Orlando



National Center
for Simulation



University of
Central Florida
Institute for
Simulation
and Training

PRODUCT LINES



TRAINING SYSTEMS

TRAINING SERVICES

TRAINING CONTENT

INTELLECTUAL SERVICES

NAWCTSD's capabilities are delivered across four primary product lines. These products lines are: training systems, training services, training content, and intellectual services.

Our training systems product line includes the hardware, software, and associated physical infrastructure that comprise both new systems and modification of existing training systems. New training systems include development or production where the system is the contractual delivery or the system is being developed with in-house personnel. Training systems modified include trainer modification where the system modification is the contractual delivery or ISEO personnel are performing a minor modification. Examples include computer rehost and minor modifications.

Training Services consists of Training Courses, Site Surveys and Fielded Systems Support under Contractor Operation and Maintenance of Simulators (COMS) contracts, either through Centrally Managed or Simulator Operation and Maintenance (SOM) funded efforts.

Our training content product line includes both content delivered or modified – curriculum development or modification where the curriculum package is the contractual delivery.

Analysis, Studies and Experimentation – A sample listing of Analyses or Studies consist of Front End Analysis, Training System Requirements Analysis, Training Situation Analysis, Technical and Operational Analysis, Mission Support Analysis, Verification and Validation Analysis, Modeling and Simulation, Mission Capabilities Study/Analysis, Patents, Publications, Specifications, and Prototypes, Small Business Innovation Research (SBIR) transitions, research transitions to acquisition projects, CRADAs, partnerships, and interagency agreements.



PROGRAM DIRECTORATES



AVIATION

The Program Director for Aviation (PDA) is aligned to both NAWCTSD and the Naval Air Systems Command Training Systems Program Manager (PMA205) for management of Naval and Marine Corps aviation training programs, systems, and products relating to aviation weapons systems, platforms, and environment. The scope includes aircraft, armament, air traffic control, aviation systems, and other related equipment. PDA provides support for aviation-related training provided by the Naval Education and Training Command (NETC) and its subordinate commands.

PROGRAMS IN THE AVIATION DIRECTORATE

P-8A POSEIDON OPERATIONAL FLIGHT TRAINER (OFT)



The P-8A Poseidon Operational Flight Trainer is a full-motion, six-degree-of-freedom (DoF) flight deck simulator. The OFT consists of a motion base, a high-fidelity reproduction of the P-8A Poseidon cockpit, a visual system to provide out-the-window (OTW) display, an aural cue system to reproduce

cockpit noises and alarms, and an Instructor Operator Station (IOS) for simulation control, monitoring, and recording of student performance. The OFT simulates the systems, equipment, and features of the P-8A Poseidon aircraft flight deck as well as the performance characteristics of the P-8A Poseidon aircraft.

P-8A POSEIDON WEAPONS TACTICS TRAINER (WTT)



The P-8A Poseidon WTT is an integrated mission crew trainer developed to allow comprehensive mission training over a wide variety of tactical scenarios and simulated geographical locations. The WTT consists of a realistic representation of the internal fuselage of the P-8A Poseidon aircraft that includes all mission crew workstations.

The WTT provides a realistic simulation environment covering the entire range of possible P-8A Poseidon tactical missions. The WTT can be coupled with the OFT. In the coupled configuration, it allows complete mission crew training.

P-8A ORDNANCE LOAD TRAINER (OLT)



The Ordnance Load Trainer (OLT) is a full-scale representation of the P-8A FWD/MID/AFT Fuselage, Bomb-Bay, and RH Wing section. It includes BRUs, Rotary Sonobuoy Dispensers, and a Mission Crew Workstation for loading and troubleshooting training. The OLT is integrated with the Virtual Maintenance Trainer (VMT). Mission System Operators will use the OLT to practice loading and using the Mission Crew Workstation and Rotary Sonobuoy Dispensers.

F/A-18, EA-18 TACTICAL OPERATION FLIGHT TRAINER (TOFT)



The F/A-18C/D Hornet, F/A-18E/F Super Hornet and EA-18G Growler TOFT provides a realistic, networked, scalable, full-spectrum combat training environment for pilots and Naval Flight Officers. The TOFT environment provides a distributed simulation mission space that allows aircrew to receive, process, and transmit commands and information. TOFT devices consist of integrated workstations and elements that simulate the actual aircraft avionics,

weapon systems, friendly and opposing forces, as well as command and control components. TOFT systems are divided into four distinct development segments. They are (1) Simulated Cockpit, (2) Mission Management System (MMS), (3) Interoperability/Naval Aviation Simulator Master Plan (NASMP) Compliance, and (4) Visual System. The TOFT is a PC-based architecture, maximizing off-the-shelf cost effectiveness and reuse. The PC-based TOFT, along with its modular software architecture, facilitates technology insertion and simulator/aircraft concurrency.

AIRFIELD TOWER OPERATOR TRAINING SYSTEM



The Device 15G32 Tower Operator Training System (TOTS) provides training for Navy and Marine Corps Air Traffic Control (ATC) trainees in a full-immersion, high-fidelity, simulated control tower environment. The 15G32 provides a safe, controlled environment for concentrated, hands-on ATC training without requirement for actual aircraft, aircrew, or flight support equipment. The 15G32 possesses the capability to simulate a wide variety of emergency conditions and malfunctions as required by the training scenario to accommodate the level and complexity of the training being conducted.

P-3 WEAPON SYSTEM TRAINER

This training device has been developed to train a full aircrew in all the missions of the P-3. The device can be coupled with the P-3 Operational

Flight Trainer (Device 2F87(F)) to afford the pilots more realistic training. Certain crew qualifications can be achieved in this device.

MV-22 FULL FLIGHT SIMULATOR



The MV-22 Full Flight Simulator (FFS) replicates the MV-22B aircraft performance during cockpit preflight, aircraft start-up, full-flight operation in both conversion and fixed-wing modes, navigational flight, instrument flight, aircraft shutdown, and cockpit post-flight procedures.

The FFS is network capable for training all Marine Corps MV-22 pilots and co-pilots for all aspects of flight to include tactics, instruments, Night Vision Goggles (NVG), procedural, etc. The FFS is mounted on a six-degree-of-freedom motion base with a secondary motion system to simulate the rotor vibrations felt by the aircrews.

MH-53E OPERATIONAL FLIGHT TRAINER (OFT)



The MH-53E OFT simulates, in real time, applicable normal and emergency aircraft operations with respect to both transient and steady-state flight, engine performance, flying qualities, aircraft system operations, radio navigation and communication systems operation, environmental effects, ground operations, and other flight parameters.

T-44A/C AIRCRAFT TRAINER SIMULATOR



The T-44 simulators, Devices 2F129A and 2F129C, are used to train Navy, Marine, Air Force, Coast Guard, and foreign military pilots in the operation, procedures, and flight of the T-44A and T-44C twin-engine propeller aircraft. Each trainer includes a cockpit with seating, instruments, controls for the pilot and a co-pilot, an Instructor's Operator Station (IOS), a digital electronic control loader system, an aural cueing system, a hydraulic motion base, and aircrew performance analysis hardware and software. Two of the five trainers have been modified to replicate the avionics upgrade of the T-44C aircraft. The current avionics upgrade effort includes the replacement of the existing aural cueing, audio communication/intercom systems, and

specified avionics to match the T-44A aircraft's avionics upgrade. Also included in upgrade projects is refurbishment of all remaining avionics and the cockpit necessitated by the integration of the avionics upgrade; modification of the debriefing system software to capture student performance with the new configuration, and revision software graphics to properly depict specified glass-cockpit instrumentation.

LANDING SIGNAL OFFICER TRAINER



The mission of the Landing Signal Officer Trainer (LSOT) is to provide realistic simulation of shipboard fixed-wing aircraft recovery operations under various standard operational conditions and under shipboard and aircraft emergency conditions. The trainer closely replicates Fleet equipment, displays, and controls. The LSOT consists of an IOS position, a simulated LSO platform, and a 270-degree visual display.

EA-6B OPERATIONAL FLIGHT/ NAVIGATIONAL TRAINER

The Operational Flight/Navigational Trainer (Device 2F143) simulates the front cockpit and performance of the EA-6B Improved Capability (ICAP) II block 89A production aircraft. It provides training in pilot and Electronic Countermeasures Officer (ECMO)/co-pilot ground, airborne, normal and emergency procedures, carrier and field takeoff/landing, in-flight control and navigation skills and techniques to enable efficient and effective operation and

management of EA-6B aircraft systems. The device consists of a high-fidelity replica of the front cockpit of the EA-6B (trainee station), an out-of-the-cockpit visual system, a motion system, an IOS



and a computer complex with peripheral equipment and power distribution system. Device simulation provides: duplication and activation of the flight controls, aerodynamic performance, instruments, communication and other operational equipment of the EA-6B cockpit. The simulation enables aircrew members to become proficient with cockpit controls in order to perform the full range of flight functions, respond to emergencies, and perform aircraft ground procedures. Aircrew activation of the controls results in instrument responses/displays that duplicate the EA-6B aircraft throughout its entire operating envelope.

H-60 TRAINERS



H-60 Maintenance and Weapons Load Trainers provide instruction and practical experience in the maintenance, troubleshooting, inspection, and adjustment of aircraft systems, in addition to the loading and unloading of weapons associated with the armed helicopter and Organic Airborne Mine Counter Measures (OAMCM) equipment.

AV-8B TRAINERS



The AV-8B Training Systems Aircrew simulator inventory includes five Weapons System Trainers. These five devices are non-motion based and provide training in the skills and techniques involved in (1) Vertical/Short Takeoff or Landing (V/STOL), (2) basic aircraft control, (3) instrument flight procedures, (4) utilization of air-to-ground and air-to-air weapons delivery modes of the AN/APG-65 radar, (5) simulated Night Vision Goggles (NVG), (6) Forward Looking Infrared (FLIR), (7) defensive electronic countermeasures, and (8) normal/degraded/emergency mode operations for all AV-8B plus radar night attack aircraft systems under day/dusk/night conditions.

The AV-8B Training systems maintenance trainer inventory includes eight hardware-based devices: 11H93 – Power Plant, 11H94 – Avionics, 11H95 – Electrical, 11H96 – Egress, 11H97 –

Fuels, 11H98 – Armament, 11H99 – Flight Controls and 11H100 – Landing Gear. The one software-based Instructor-led training device is the Instructional Graphics Training Device (IGTD).

AIRCRAFT FUEL CELL TRAINER



The Aircraft Fuel Cell Trainer, Device 2H154, is a multi-faceted fleet training aid that will be utilized to provide realistic initial fuel cell entry and maintenance training to maintenance personnel.

The purpose of the trainer is to provide Enlisted Navy and Marine Corps maintainers with hands-on experience in performing fuel cell entry preparations, fuel cell entry procedures, fuel cell inspection procedures, component removal and installation procedures while demonstrating a thorough knowledge of all safety precautions.

The trainer contains two mobile, self-contained, freestanding generic fuel cells with an aircraft-shaped fuselage exterior. All components in the trainer are based on real aircraft parts. The trainer gives maintainers the opportunity to practice organizational maintenance procedures and troubleshooting skills on an aircraft fuel cell. The main focus of the trainer is the simulated fuel cells with removable access panels, permitting students access to the fuel cells to inspect internal components. Three students are permitted on top of the trainer and three student observers or instructors are permitted on each wing.

SHIPBOARD AIR TRAFFIC CONTROL TRAINING SYSTEMS



Device 15G30, Advanced Shipboard Air Traffic Control (ATC) Training System (ASATS), consists of the Carrier Air Traffic Control Center (CATCC), and the Amphibious Air Traffic Control Center (AATCC). CATCC provides individual and team training in aircraft carrier ATC operations. AATCC provides individual and team training in amphibious aviation ship ATC operations.

AATCC, formerly known as Helicopter Direction Center (HDC), includes both HDC and Tactical Air Control Squadron (TACRON) capabilities. TACRON control consists of Tactical Air Traffic Control (TATC) and Tactical Air Direction (TAD). The TATC controller is responsible for the airspace. The TAD controller controls all aircraft in the assigned operational area, assigns missions and targets, and monitors Bomb Damage Assessments (BDAs). The TAD also maintains communication with the Forward Air Controller (FAC).

CATCC and AATCC each consist of a host computer system with peripheral equipment, an IOS, simulated shipboard controller positions

surrounded by the auxiliary indicators, lights, and status boards found in the shipboard operational environments. The computers are connected via a local area network to a speech recognition/response and simulated operational communication network.

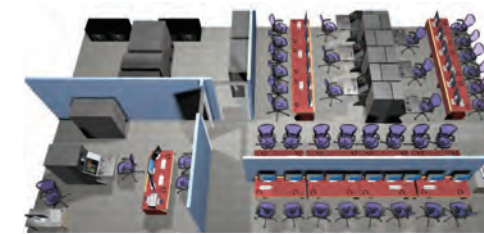
KC-130J WEAPON SYSTEMS TRAINER DEVICE 2F199



The KC-130J Weapon Systems Trainer (WST) Device 2F199 simulates the operational and performance characteristics of the KC-130J aircraft in order to facilitate flight training and cockpit familiarization under normal, adverse, and emergency conditions. The WST systems and equipment function interactively to simulate the aural, visual, and motion conditions experienced during actual KC-130J aircraft operations. The WST contains actual, modified, and simulated aircraft equipment, complete with working controls, indicators, panels, and instruments. Aircraft seats and seat tracks are used along with furnishings and general equipment. Cockpit instruments, indicators, panels, consoles, skirts, and controls are configured like the KC-130J. On the WST, the windscreens are simulated to provide an enclosed effect as in the aircraft, but are specifically tailored to suit the needs of the visual system.

MULTI-CREW SIMULATOR PROGRAM (MCS)

The Multi-Crew Simulator Program (MCS) consists of two reconfigurable mission trainers and associated



supporting Interactive Courseware (ICW). The MCS Trainer system will train multi-crew aircraft Student Naval Flight Officers (SNFOs) to acquire advanced military aviation skills in airways and radar navigation, weapons system operations, sensor utilization and electronic warfare operations, communications effectiveness, situational awareness, and in-flight decision making for E-2, P-3/P-8, EP-3 and E-6 Naval Flight Officer Undergraduate Training. The MCS also supports the introduction of E-2D and P-8 aircraft and the divestiture of T-39 aircraft.

E-2C/C-2A RECONFIGURABLE FLIGHT TRAINING DEVICE (RFTD)



The RFTD was designed to provide enhanced part task training for both CNS/ATM configured E-2C/C-2A and baseline Hawkeye 2000/C-2A cockpits with NP2000 propeller systems. It trains pilots/co-pilots for normal/emergency procedures, aircrew coordination training, carrier and land based operations and was designed to support transition training to the CNS/ATM advanced technology cockpit. LCD touch screens are used to interface with cockpit components. A visual system and flight control loading system are used to accurately model

aircraft characteristics. The RFTD can rapidly change aircraft configurations without needing re-boot or host system management.

E-2D OPERATIONAL FLIGHT TRAINER (OFT)



The E-2D OFT is part of the Hawkeye Integrated Training System (HITS) that also includes curriculum and a training management system. It trains pilots/co-pilots for normal/emergency procedures and both carrier and land based operations.

E-2D TACTICS TRAINER (TT)



The Tactics Trainer (TT) Trains Naval Flight Officers in both systems usage and troubleshooting, as well as tactical employment for Command and Control (C2) and Airborne Early Warning (AEW).

E-2D WEAPONS SYSTEM TRAINER (WST)

The OFT and TT can be linked, enabling the two devices to act as one to train the entire crew of five together. When coupled, the devices are referred to as the WST.



SURFACE &
UNDERSEA

The Surface and Expeditionary Warfare Programs manages training programs, systems, and products to support the training needs for Naval Surface and Expeditionary Warfare weapons, Command and Control, and Hull, Mechanical, and Electrical systems. Surface and Expeditionary Warfare Programs provides support for surface and expeditionary warfare related training provided by the Naval Education and Training Command (NETC) and its subordinate commands.

SURFACE PROGRAMS

LITTORAL COMBAT SHIP (LCS)
TRAINING SYSTEM EXECUTIVE
AGENT (TSEA)

In May of 2010, the NAWCTSD Program Directorate joined LCS Program Training Office (PMS 505T) and the LCS Mission Package Program Office (PMS 420) as the Littoral Combat Ship (LCS) Training System Executive Agent (TSEA). The LCS is designed to defeat growing littoral threats and provide access and dominance in the coastal water battlespace. A fast, maneuverable, and networked surface combatant, the LCS provides the required warfighting capabilities and operational flexibility to execute focused missions close to the shore such as mine warfare, antisubmarine warfare and surface warfare. A flexible and reconfigurable seaframe, LCS derives combat capability from rapidly interchangeable mission modules and an open architecture command and control system. Modularity maximizes the flexibility of LCS and enables commanders to meet changing warfare needs, while also supporting spiral development and technology refresh.

The LCS is designed to provide each crew member with the technological ability to perform multiple functions. With a base crew of fifty, LCS will also have twenty crew members in an aviation detachment, plus fifteen sailors in its selected mission package. Because of its small crew and high-tech capabilities, LCS sailors will be required to report to their ship ready to stand the

watch. The old shipboard training regime was not an option for LCS crews. This is a totally new training paradigm for the surface Navy, and it has to be built correctly from the bottom up. Add to this challenge the requirement to build training for two different LCS Class ships in at least three different warfare missions and one can begin to understand the magnitude of the training challenge. The LCS Program approach is to implement a training strategy that will support the Train to Qualify (T2Q), Train to Certify (T2C), and “Rapid Refresh” objectives.

As the LCS TSEA, NAWCTSD Program Directorate coordinates the training efforts of the entire LCS Team. NAWCTSD Program Directorate is currently supporting detailed Front End Analysis (FEA) work, and leveraging NAWCTSD’s contracting expertise to ensure the Navy finds the best industry partners available to build and sustain the LCS training system of the future. Using a strategy based on “Virtual Ship Operations”, NAWCTSD is coordinating the use of many different kinds of training products to meet the many needs of LCS. These products include technologies such as Conning Officer Virtual Environment; LCS-1 and LCS-2 Readiness Control Officer Trainer; LCS Tactical Action Officer Trainers; and LCS Mission Package Trainers. NAWCTSD Program Directorate is also supporting the design and implementation of facilities for these new LCS trainers—as well as assisting



with identifying facility modifications that may be required. Finally, NAWCTSD work includes the identification of new training courses and media such as the need for developing a team Mission Bay Trainer (MBT) to ensure the proper training of all LCS Launch, Recovery and Handling System skills. This MBT team trainer will include the use of Tactical Training Equipment as well as the design and construction of both low- and high-fidelity trainers not yet available today.

LCS IMMERSIVE VIRTUAL SHIP
ENVIRONMENT (IVSE)

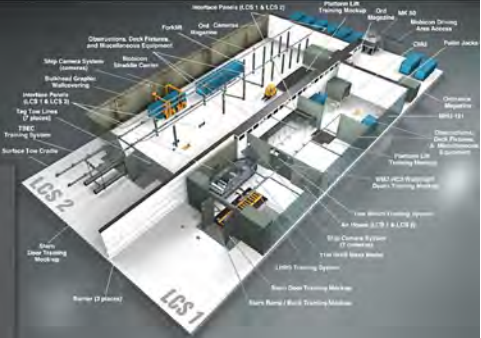
In response to the Littoral Combat Ship program requirement that all crewmembers be individually qualified (Train to Qualify – T2Q) and team certified (Train to Certify – T2C) in a shore-based training environment prior to reporting aboard ship, in January 2013 NAWCTSD awarded three Immersive Virtual Ship Environment (IVSE) courseware, the first significant acquisition action in support of the LCS program’s virtual ship centric training initiative contracts.

This IVSE requirement is technically complex as the integration of instructionally sound training content and the depiction of actual LCS spaces presented within a state-of-the-art gaming engine has never been



attempted on this scale and with a mandate to accomplish T2Q/T2C ashore. IVSE development is in progress for LCS engineering watchstations and development for all LCS watchstations is planned across the FYDP under these contracts.

LCS MISSION BAY
TRAINER (MBT)



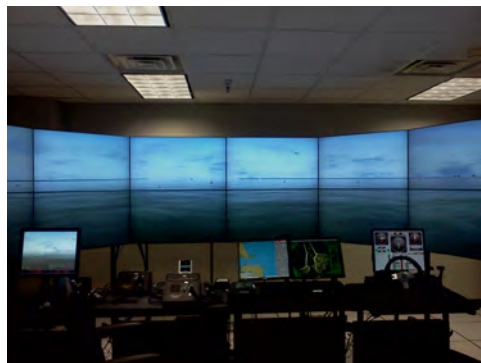
In November 2013, NAWCTSD awarded the \$113M LCS Mission Bay Trainer (MBT) contract to deliver an integrated family of training devices to support qualification and certification of sailors responsible for Launch, Handling, and Recovery of LCS Mission Bay systems. The LCS Mission Bay is referred to as the “main battery” of the ship where seaframe crews and Mission Module detachments work together to store, maintain, launch, handle, and recover MCM, SUW, and ASW Mission Package systems and equipment. The MBT is actually a family of trainers that includes: Operational Equipment Training Devices, Haptic Training Devices, Ordnance Magazine Training Devices, Mission Module Training Devices, Simulators, and Special Purpose Items. The San Diego,

California, MBT will support training for both LCS seaframe variants and will consist of approximately 60 individual training devices occupying almost 60,000 sq. ft. of space in the LCS Training Facility. The Mayport, Florida, MBT will support the LCS 1 variant only and include approximately thirty training devices occupying almost 30,000 sq. ft. in the LTF.

MULTI-MISSION TACTICAL TRAINER (MMTT)

The Multi-Mission Tactical Trainer provides tactical sensor and Command and Control (C2) simulations for use by ship and ship-air combat teams, as well as strike group staff supervisory-level personnel. MMTT can run as a stand-alone multi-ship/multi-aircraft trainer, or it can be interfaced to existing training devices to upgrade or enhance current training capabilities. The MMTT is used for different types of training depending on the site where it is installed. Current schoolhouse training use is for Tactical Action Officers (TAOs), Air Intercept Controllers (AICs), Tactical Data Link (TDL) Operators, Anti-Submarine Warfare (ASW) Operators, and Fleet unit Combat Information Center (CIC) Operators. Waterfront training focuses on AICs, TDL Operators, ASW Operators, and multi-ship ASW teams.

TRANSIT PROTECTION TRAINING SYSTEM (TPTS) TRAINER



Patrol Commander Bridge Station



Configurable Escort Vessel Bridge Station

NAWCTSD's Surface and Expeditionary Directorate delivered a Transit Protection Training System (TPTS) to Trident Training Facility, Bangor, Washington, and Trident Training Facility, Kings Bay, Georgia. These trainers provide capability for Transit Protection Units to conduct integrated team training under full range of operational situations. The trainers provides a 360-degree field of view bridge station for the patrol commander vessel with nine configurable escort vessel bridge stations which are integrated for full mission training. In addition, there is an Instructor Operator Station and Briefing Room Station.

LANDING CRAFT AIR CUSHIONED (LCAC) FULL MISSION TRAINER (FMT)



The LCAC FMT is an operations team trainer for the Operator, Engineer, Navigator, and Group Commander of the LCAC. The FMT replicates the SLEP LCAC Control Cabin and provides capability to train the crew in the complex skills required for the safe

operation of the SLEP LCAC in both normal and casualty modes. It consists of:

- A six-degree-of-freedom hydraulic motion system
- A 180-degree field of view visual display
- An aural system for communications and sound effects
- Three Instructor Operator Stations (IOS) with one repeater located onboard the FMT
- Computer equipment, and associated peripherals

VIRTUAL ENVIRONMENT LCAC (VELCAC)

VELCAC is a high-fidelity touch screen enabled part task trainer that emulates, in a combination of virtual and physical environments, the SLEP and Legacy LCAC crew compartment physical configuration, functionality and dynamics of the instrumentations, displays and controls and their interactions with the simulated external environment. Provides integrated team and individual crewmember training for the SLEP and Legacy LCAC Operator, Engineer, and Navigator in the normal operation, emergency and casualty procedures, and missions of the SLEP LCAC.

BASIC DIVISION OFFICER'S COURSE (BDOC)

Although BDOC was not included in the FY12 budget, the Commander, Naval Surface Forces, late in the second quarter of FY12, made the decision that stand-up of BDOC by the end of the fiscal year was critical to training new accession Surface Warfare Officers. NAWCTSD was asked to take the lead. Working with Naval Sea Systems Command (NAVSEA) PMS-339 and OPNAV N96, the NAWCTSD IPT identified the funding, negotiated the contracts, pulled together all stakeholders, and

successfully completed facility refurbishment, training equipment procurement, installation, integration and testing in both San Diego, California and Norfolk, Virginia in less than six months. Administered by the Surface Warfare Officers School Command (SWOS) in Newport, Rhode Island, BDOC is an intensive, eight-week course of instruction designed to provide foundational classroom training to prospective Surface Warfare Officers. The course places emphasis on in-class instruction and the use of technology such as the Conning Officer Virtual Environment (COVE) trainers. These trainers simulate every class of ship in the U.S. Navy and their homeports, in addition to many routine ports of call around the world. COVE allows for the reinforcement of concepts in navigation, seamanship, and shiphandling. Each BDOC installation includes nine COVE's and one Voyage Management System Operator training device, as well as four Electronic Classrooms (ECR) in San Diego and three ECR's in Norfolk.

SURFACE FIREFIGHTING AND DAMAGE CONTROL TRAINING SYSTEMS

NAWCTSD's Surface and Expeditionary Directorate delivered firefighting and damage control training systems to Surface Warfare Officer School (SWOS) Engineering Learning Sites in Norfolk, Virginia; San Diego, California; Mayport, Florida; Pearl Harbor, Hawaii; and Great Lakes, Illinois; Officer Training Command in Newport, Rhode Island; and Recruit Training Command in Great Lakes, Illinois. These trainers provide capability for surface sailors to conduct basic and advanced live-fire and get-wet damage control team training under full range of operational situations. The trainers are the Advanced Firefighting Trainer (FFT) (Device 19F1A Mayport, Device 19F1B

San Diego and Device 19F1B Norfolk), Basic FFT (Device 19F3B San Diego and Device 19F1B Norfolk), Multipurpose Shipboard FFT (Device 19F3A Newport and Device 19F3C Great Lakes), Aviation FFT (Device 19F4A San Diego, 19F4A Norfolk and Device 19F4A Mayport), Recruit FFT (Device 19F5 Great Lakes), Advanced Shipboard and Aviation FFT (Device 19F6 Pearl Harbor), and Surface Damage Control Trainer (Device 20C28 Pearl Harbor). NAWCTSD procured these training systems and provide in-service support including contractor maintenance, upgrade modifications and service life extension modernization.



Device 19F4A Aviation Fire Fighting Trainer



Device 19F1B Advanced Fire Fighting Trainer



Device 20C28 Surface Damage Control Trainer

AEGIS ASHORE TEAM TRAINER (AATT)

The AATT will provide the capability

to train to individual watchstander level of qualification and then train to certification level for the entire AEGIS Ashore Missile Defense System (AAMDS) watch team prior to deployment to Romania in 2015. The AAMDS is the designated weapons capability for the Ballistic Missile Defense (BMD) of Europe as directed by the Phased Adaptive Approach (PAA) currently being executed by the Missile Defense Agency (MDA). The AAMDS is a Navy shore based capability that will protect friendly forces and assigned defended areas against ballistic missile attack.

The delivered training system will consist of two training subsystems; Combat Information Center (CIC) training subsystem and the AEGIS Ashore Assured Command, Control, Communications, Computers, and Intelligence (A3C4I) training subsystem, as well as Government Furnished Equipment that includes: (1) Common Data Link Management System/Next Generation Command and Control Processor (CDLMS/NGC2P) AN/UYQ-86(V)6 CDLMS GFS version 3.7.2 GFE commercial equivalent solution with GOTS, (2) Global Command and Control System-Maritime (GCCS-M) GFE commercial equivalent solution with GOTS, (3) Joint Tactical Terminal - Maritime (JTT-M) (AN/USQ-151) GFE ruggedized equipment, and (4) Shipboard Gridlock System with Automatic Correlation (SGS/AC) (MK-162 MOD 3) GFE commercial equivalent solution with GOTS.



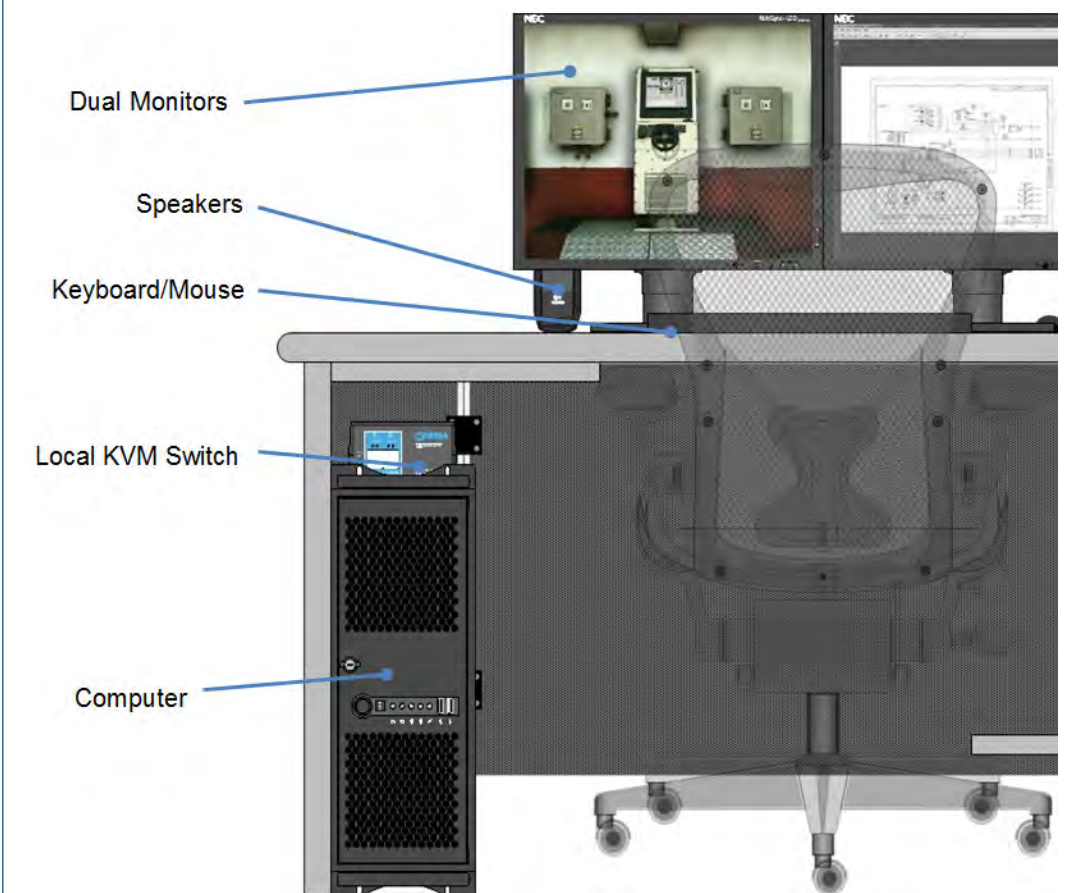
The AATT training system capability will be contained within the NAS

Oceana, Dam Neck Annex, Gallery Hall facility designated training rooms. The delivered training system will closely replicate and resemble the host nation AAMDS CIC, associated infrastructure items equipment, and tactical software configuration form, fit and function capabilities required for initial fleet BMD 5.0 training mission accomplishment.

VIRTUAL MAINTENANCE PERFORMANCE AID (VMPA) NAVIGATION SYSTEM MAINTENANCE TRAINER (NSMT) DEVICE

The VMPA-NSMT will ultimately provide a 3D virtual environment simulator capable of virtual training for

WSN-7/9, NAVSSI simulations.



the performance of the Integrated Bridge Navigation System (IBNS) and Navigation System Technician related Combat Systems Operating Sequencing System (CSOSS) operations, Planned Maintenance System (PMS), normal operations to support maintenance, abnormal conditions, troubleshooting, and system maintenance and repair procedures. The establishment of this training capability will be an integral component of the Navigation Technician (NAVTECH) pipeline requisite training. In addition, it contributes to the establishment of a training regimen stressing the interrelated system of systems that make up a ship's navigation architecture to include

HARDWARE DESIGN –STUDENT CONFIGURATION

NAVAL SEAMANSHIP AND SHIPHANDLING CONNING OFFICER VIRTUAL ENVIRONMENT (NSS COVE)



The COVE family of trainers is a system of scalable, reconfigurable PC-based simulators, offering an immersive virtual reality maritime training environment. They provide the full continuum of navigation, seamanship, shiphandling, piloting, and tactical ATFP (Anti-Terrorism/Force Protection) training for Naval personnel. Originally conceived in 2000 as an Office of Naval Research (ONR) Research and Development (R&D) effort, COVE has evolved into a robust and extensible shiphandling simulator, utilized at the Surface Warfare Officers School (SWOS) in Newport, Rhode Island, and installed in fleet concentration areas.

Based on the COTS software architecture, COVE contains a high degree of additional functionality in order to support NSS training. It features hydrodynamically accurate high-fidelity ship models for all existing U.S. Navy combatants, a selection of U.S. Coast Guard cutters and small boats, and a wide array of foreign military vessels, merchants, fishing boats, and other commercial vessels. The collection of over 70 visual (harbor) databases covers virtually every major U.S. and foreign port that the U.S. Navy regularly visits. The Tactical COVE

(TA-COVE) is a full mock-up of a ship's bridge, surrounded by a 360-degree screen, with twelve projectors providing a high-definition visual scene for day or night tactical training. Unlike the other COVE configurations which are designed to train a single officer, this Full Mission Bridge supports watch team training of 6-10 personnel. It includes electronic (virtual view) binoculars for target identification and HMDs to supplement the primary on-screen display allowing the Conning Officer to look down from the bridge wings for docking or pier side maneuvering. TA-COVE teaches core decision-making skills in difficult preconstructed scenarios. These skills include situational awareness, task prioritization, multi-tasking, weapons engagement, tactical maneuvering, and communication. The system is designed with the fidelity to train watch teams in the dynamic decision making process needed to defend against terrorist vessels and other force protection threats.

The Littoral Combat Ship (LCS) bridge trainer is the most recent configuration built on the COVE baseline. Developed to train the officers manning the Navy's newest surface combatant, it features five large LCD screens that provide a realistic, high-fidelity field of view. Responsive controls and integrated radar, navigation, and engineering status displays provide the watchstanders with the data needed to conduct everyday operations. The architecture of the LCS COVE trainer allows rapid reconfiguration of the ship control console to support high-fidelity training on both LCS-1 and LCS-2 bridge configurations. The reduced manning of an LCS bridge watch team represents a paradigm shift for the Navy, and the LCS COVE trainer successfully provides the immersive environment needed to train LCS crewmembers to handle this new skill set.

One of the key features of COVE is its ability to easily link different

configurations of the simulator together into a single training event. This allows for the simultaneous training of many officers of varying rank and responsibility, utilizing a diversity of ship classes, within a shared virtual environment. This scalable functionality allows for the creation of complex training scenarios, addressing learning objectives that were previously impossible to teach in a classroom.

FULL MISSION BRIDGE TRAINER 2 (FMB 2)



In May 2013, NAWCTSD delivered the Full Mission Bridge 2 training system

to Surface Warfare Officer's School in Newport, Rhode Island. The trainer provides a first for the Navy with its "look down" capability which allows students to look down "over the side" from a replica of a typical U.S. Navy warship's bridge when docking or interacting with nearby vessels. The trainer will support training for lieutenants, commanders, lieutenant commanders and department heads on ship handling, precision navigation and other areas. Trainees using the FMB 2 can practice navigating in and out of harbors using markers and sea buoys or pulling alongside other ships for replenishment operations. The simulator is highly configurable, and controllers can manipulate everything from the number of ships in the channel and the weather to the time of day and the current. In many cases, the simulator can actually provide better training than the real world simply because of its flexibility.

UNDERSEA

The Undersea Programs manages training programs, systems, and products relating to undersea weapon systems, platforms and environment, including submarines, submarine systems, integrated undersea surveillance, deep submergence and other related systems; and support for undersea-related training provided by Naval Education and Training Command (NETC) and its subordinate commands.

UNDERSEA PROGRAMS

MULTI-PURPOSE RECONFIGURABLE TRAINING SYSTEM (MRTS)

The Multi-Purpose Reconfigurable Training System (MRTS) family of trainers provides a virtual training environment simulating a variety of weapons and communications systems. Each trainer consists of government-owned simulation



software running on a stand-alone network of commercial-off-the-shelf (COTS) hardware and software components. A single MRTS hardware trainer can shift between multiple software simulation applications within a few minutes. This capability enables a training command to use one hardware device to give photo-realistic virtual training on several different systems in a single day.

The MRTS trainers are used in both Sailor pipeline courses and in pre-deployment team training. The instructor can manage configurations and scenarios and insert faults while the students follow procedures, interact with the touch screens, and coordinate with the other stations during the different scenarios of the training session.

WEAPONS LAUNCH CONSOLE TEAM TRAINER (WLCTT)



WLCTT VA Torpedo Room

The MRTS Weapons Launch Console Team Trainer (WLCTT) provides team and individual training on firing scenarios for Machinist's Mates (MM) and Fire Control Technicians (FT). Team training scenarios include Tomahawk Missile Launch for both vertical and horizontal tubes and ADCAP normal and quick reaction firing for all the supported configurations. The MRTS WLCTT is capable of operating with one instructor and providing for home port refresher and weapons console qualification in a safe and immersive training environment.

Team training on the MRTS WLCTT is a potent and cost-effective

alternative to shipboard training. It provides for multiple configurations of submarines, and for virtual launches of cruise missiles and torpedoes. Training on the MRTS WLCTT provides a quick method to start scenarios at critical points within each configuration. It also provides a means to move to these critical points for focused training sessions. Instructors can easily change configurations and scenarios with just a few button clicks. Some of the MRTS WLCTT's configuration subsystems include the Common Display Console (CDC), Attack Center Console (ACC), Status Firing Panel (SFP), Tube Control Panel (TCP) [MT/TT], Command Launch Console (CLC), Weapons Interface Module (WIM), Weapons Monitoring Panel (WMP), and Weapons Control Console (WCC).

COMMON SUBMARINE RADIO ROOM (CSRR) OPERATOR AND MAINTENANCE TRAINERS

The MRTS Common Submarine Radio Room (CSRR) trainer provides an instructor the ability to provide radio training in a virtual training environment. MRTS CSRR can be configured to replicate the different tactical increments and versions of the CSRR system for each specific submarine class. The trainer is customizable to allow a communication team to utilize their boat's communications plan, simulating an actual at-sea scenario. At any time, the instructor has the ability to insert a predefined simulated fault into the system to test the communications team or student response. Once a fault is inserted, the students exercise their ability to diagnose and work around the fault.

The MRTS CSRR Maintenance Trainer provides the ability to execute approved troubleshooting procedures to simulated repair, replacement, alignment, and/or adjustment of specified components of the CSRR

system as part of an approved troubleshooting procedure. The instructor will inject a fault at the Instructor Operator Station (IOS), which will cause the Operator Trainer to come up in a faulted state. The student will then be directed to perform an operator action. During the operation the student will detect or experience problems. The trainee will then use their designated documentation laptop and technical manuals to troubleshoot the fault down to a specific device. Once the student determines the fault, they will perform corrective maintenance on the faulty device.

SUBMARINE COMMUNICATION SUPPORT SYSTEM (SCSS) TRAINER

The MRTS Submarine Communication Support System (SCSS) trainer provides 688 Class reconfigurable team and individual training in communications similar to that provided by the CSRR Operator trainer.

AN/BLQ-10 MAINTENANCE TRAINER

The MRTS AN/BLQ-10 Maintenance Trainer provides the ability to execute corrective maintenance procedures to simulate repair and replacement of specified components of the AN/BLQ-10 system as part of an approved troubleshooting procedure. The instructor will inject a fault at the Instructor Operator Station (IOS), which will cause the Operator Trainer to come up in a faulted state. The student will then be directed to perform an operator action. The trainee will use their designated documentation laptop and technical manuals to perform the corrective maintenance on the faulty device.

MRTS 3D VIRGINIA EMERGENCY DIESEL GENERATOR



The MRTS VIRGINIA Emergency Diesel Generator (EDG) provides a software simulation of the entire VIRGINIA class Auxiliary Machinery Room using advanced 3D graphics with correct component locations. The system enables operator training on all EDG operating and casualty procedures.

HULL, MECHANICAL, AND ELECTRICAL TRAINERS

Fire Fighting Trainer (FFT)

Firefighting Training for submarine crewmen centers on the trainee's actions while interacting with other members of the damage control team in the extinguishment of a large fire. Examples of large fires include bilge, hull insulation, and oil spray fires. The Submarine FFT is a "live fire" training environment designed to simulate combating submarine fire casualties. The trainer is integrated into a specially designed, compartmentalized building that has a training compartment, an instructor operator station compartment, a burner room, trainee staging areas, and storage for firefighting equipment.

Students enter the training compartment through a submarine hatch. The training compartment has three propane-fueled fireplaces: Hull Insulation (Class A), Bilge/Oil Spray (Class B), and Electrical Panel (Class C). The training compartment and fireplaces have mock-ups and obstructions to simulate the onboard submarine space. Students are taught to use submarine fire hoses and extinguishers such as simulated Aqueous Film Forming Foam (AFFF), and CO₂ to fight various types and classes of fires.



The trainer has an environmentally safe, mineral oil-based smoke generation system to provide smoke obscuration during training. Students wear submarine approved protective clothing and air breathing equipment, such as a Self-Contained Breathing Apparatus (SCBA) or an Emergency Air Breathing (EAB) mask. The FFT safety system is designed to continuously monitor propane levels and compartment temperatures and will activate trainer shutdown when preset values are exceeded. Emergency stop switches are located on the Instructor Operator Station (IOS) and inside the training compartment in case of a training timeout or an emergency. During

trainer shutdown, high capacity ventilation fans are activated automatically and propane valves are closed to prevent fuel flow. In addition to the submarine hatch entrances, the training compartment has an emergency corridor and two emergency exits for safe evacuation of personnel in the unlikely event a critical incident may occur.

Each trainer is equipped with an IOS, compartment control panel, internal communications, typical shipboard alarms/lights, and other shipboard equipment. Communications between the IOS and training compartment is provided by two-way sound-powered telephones, intercom system, 4MC Damage Control communications system, and two-way handheld radios. From the IOS, instructors use the computer-based operating system to set up firefighting scenarios for two-day basic, two-day advanced and one-day team training. The training scenarios include flame growth, flame spread, flame extinguishment, and flame re-flash. Pipeline and submarine crew firefighting training is conducted on a continual basis throughout the year at the submarine homeports.

Damage Control Team Trainer



The Submarine Damage Control Team Trainer (DCTT) is a shore-based, dynamic wet training facility used to train and evaluate damage control team performance in the identification, reporting, and repair of flooding casualties resulting from controlled water and air pipe leaks. The simulated

environment features a mock-up of a submarine port side engine room, which provides a realistic environment for the training objectives. Air and water pipe leaks are initiated from the instructor console. Crew actions in response to these leaks provide the criteria for evaluation and critique of damage control team performance during realistic casualty situations.

The DCTT is a watertight, concrete, stand-alone structure configured to represent a submarine hull. Catwalks, ladders, pump and equipment mock-ups, emergency air breathing (EAB) equipment, battle lanterns, communication equipment, loudspeakers, and other equipment complete the illusion of an operating submarine. The DCTT water distribution system includes a 1200 GPM pump that draws water from a 24,000 gallon storage tank. The pump is driven at 1750 RPM and delivers water at a pressure of 80 PSI to the trainer. The DCTT piping/valves are routed through and around the simulated engine room mock-ups. A water treatment system continuously filters, chlorinates, heats, and circulates the trainer water.

Automated Electrolytic Oxygen Generator (AEOG) Trainer



The AEOG trainer provides individual hands-on training for operators and technicians on selected preventative maintenance procedures, fault analysis, and troubleshooting procedures on the model 6L16E. This trainer interfaces with the PC-based instructor station

and associated Simulator Input/Output (SIO) equipment which interfaces with controls and indications that look and operate like the tactical AEOG. The training scenarios are designed to duplicate actual operational and maintenance procedures used on board a submarine.

NAVIGATION TRAINERS

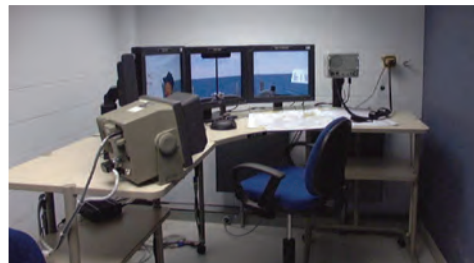
Submarine Piloting and Navigation (SPAN) and Reconfigurable Submarine Piloting and Navigation (RSPAN)



The Submarine Piloting and Navigation (SPAN) trainer provides team and individual training in piloting and navigation principles of a surfaced submarine. SPAN trainers use a PC-based Image Generator (IG) to produce a simulated visual scene of a harbor/ waterway as if the submarine were traveling on the surface. The team uses navigation techniques and simulated and tactical equipment to ensure the ship is safely piloted and navigated in various harbors and under variable environmental conditions.

The SPAN trainer provides team or individual training for the Helmsman, Fathometer Operator, Navigation Center Operator (GPS and Inertial Navigation equipment), Voyage Management System (VMS) Operator, Navigation Plotter (paper charts), Contact Coordinator, Fire Control Technician, Periscope Operator, Data Recorder, Electronic Deck Log (EDL) Recorder, BPS-15H Radar Operator, Commercial Radar operator, Officer of the Deck

(OOD), and Lookout. The Engineering Officer of the Watch (EOOW) and the Sonar Supervisor are simulated through automatic engine order responses and tracker assignments in the sonar system. SPAN can stimulate commercial and military navigation equipment. Key to training is the ability of SPAN to provide an accurate replay of a training session. Additionally, the instructor can insert equipment faults, change weather, sea state, tide and current environmental factors, create and change surface ship traffic level, and train in over fifteen worldwide ports and open ocean scenarios.



The Reconfigurable Submarine Piloting and Navigation (RSPAN) trainer can be configured to any class of submarine navigation training system and, if necessary, reconfigured in a matter of minutes. To convert from one configuration to another, the instructor need only select the appropriate stations from the Keyboard/Video/Mouse (KVM) system on the trainer floor, load the appropriate hull configuration at the instructor station, and initiate the training scenario. Like SPAN, the RSPAN provides work stations for all members of the navigation party. RSPAN adds support for VIRGINIA class submarines and advanced systems such as the photonics mast.

Virtual Environment Submarine for Shiphandling (VESUB)

VESUB is a virtual-reality based computer system utilizing Virtual Environment and Head Mounted Display technology. The trainer provides the Officer of the Deck (OOD) trainee individual instruction in the knowledge

and skills necessary to successfully and safely pilot and maneuver a surfaced submarine through restricted waterways while avoiding collisions and grounding.



VESUB immerses a student in a virtual waterway scene under varying geographic, environmental, and emergency conditions. The trainee stands in a bridge mock-up, wearing a head-mounted visual display with a 78-degree horizontal Field-Of-View (FOV) and a 40-degree vertical FOV and communicates with other virtual members of the submarine crew. A full 360-degree simulated harbor can be seen by the student by turning the head or body. VESUB allows the OOD to view the selected harbor or restricted waterways and control ship parameters (course, speed, and rudder).

VESUB has Commercial-Off-The-Shelf hardware and software, an Instructor Operator Station, a visual system, trainee station, voice recognition and synthesis system, audio system, screen displays, and a printer.

A key feature of VESUB is its ability to provide an accurate "replay" of a completed training session, recording a student's actions and allowing all scenario events to be played back in a Debrief mode.

Submarine Skills Network (SubSkillsNet)



SubSkillsNet is government owned software that provides on-board skills training for individuals, sub-teams, and teams using an integrated system of simulations that can be configured to meet a variety of training objectives (e.g., contact coordination, navigation, tactical plotting, navigation plotting, fire control, and sonar operation). These simulations run networked together, or in stand-alone mode, to provide individual operator or team training capabilities in the schoolhouse

environment (training classrooms and labs) as well as on board a submarine.

The instructor workstation allows an instructor to set up, control, and monitor dynamic exercises. The newly designed PerfEval application allows an instructor to monitor important parameters during an exercise, to collect and display student performance data and to support after-exercise critiques.

SubSkillsNet resulted from ONR research transitions and is heavily leveraged among different training communities such as submarine and surface navigation students and crews and NROTC cadets. It is the primary training path for Navy transition from paper charts to electronic charting (Voyage Management System). It supports thirteen submarine courses and eight different types of submarine training labs/environments in nine geo-locations and onboard all submarines.



CROSS-WARFARE

The Program Director for cross-warfare (PDX) manages training programs, systems, services, and products related to individual training, joint services, cross and multiple warfare areas, non-DoD systems and applications, and command-directed areas of interest. Typical projects in this directorate are those supporting Naval education and training claimancy, special operations, Joint Forces Command, the modeling and simulation community and organizations external to the DoD, such as Department of Homeland Security. The directorate is often the incubator for leveraging emerging technologies or non-traditional training methodologies such as leveraging gaming and entertainment industry techniques.

PROGRAMS IN THE CROSS-WARFARE DIRECTORATE

BATTLE STATIONS 21



The USS TRAYER, a three-quarter-size replica of a guided missile cruiser, is the central component of Battle Stations 21, commissioned in June of 2007. NAWCTSD served as the acquisition manager for this ground-breaking training system.

Recruits enter the training system's 157,000 square-foot building to find themselves on a "pier," complete with a façade that resembles an actual pier in Norfolk, Virginia. Realism is enhanced with special effects lighting, scents of sea water and diesel fuel, surround audio, and 90,000 gallons of water sloshing between the pier and the "ship". Battle Stations 21 incorporates the latest in virtual reality programs, entertainment technology, and modern design and construction techniques. About 45,000 recruits a year move through 17 different shipboard scenarios that test problem-solving, communications, and other essential skills. NAWCTSD has received

numerous awards for its work with Battle Stations 21.

CROSS WARFARE P-3 AIR CREW TACTICAL TEAM TRAINER (PACT3)



The combined effects of reduced operationally-ready aircraft due to P-3 fatigue-related groundings, increasing demands to support non-Anti-Submarine Warfare (ASW) missions, and the inherent complexity of ASW sensor training have resulted in a marked decrease in P-3 aircrew ASW operational proficiency. A Commander, Patrol and Reconnaissance Group (CPRG) analysis has shown a 25% decline in the average ASW aircrew ability to successfully complete the ASW kill-chain and a 33% increase in the time to conduct a Critical Contact of Interest (CCOI) ASW prosecution following detachment and/or deployment to remote sites where real-world ASW missions are at a minimum.



In response to this training shortfall, NAWCTSD, in cooperation with its military and private industry partners, developed the P-3C Aircrew Tactical Team Trainer (PACT3.) The PACT3 is a low-cost, low-footprint, deployable, high-fidelity training system which provides ASW aircrew members with the means to maintain highly perishable skills at forward-deployed locations.

The PACT3 provides a first-ever PC-based training capability for currently fielded P-3 Maritime Patrol Aircraft that can be reused with very minor flight dynamics model modifications to represent the Navy's future P-8 Maritime Patrol Aircraft. The trainer also allows for cross platform (Aviation, Surface, Sub-Surface) coordinated ASW integrated team training. Five P-3 aircrew stations and an instructor station have been developed for the PACT3 system, including: Pilot, Tactical Coordinator (TACCO), and Sensor Stations 1, 2, and 3 (SS1, SS2, SS3). The capabilities of these stations include the functionality to perform valuable ASW training.

The PACT3 provides Science and Technology (S&T) innovation in four principal areas: 1) non-acoustics stimulation, signal processing and display, 2) acoustics processing, 3) training system capacities and 4) system interoperability. Using the Mission Rehearsal Tactical Team Trainer (MRT3) and Effective Active Acoustic Simulation (EFAAS) technology baselines, the PACT3 provides innovative software implementations of active and passive sensing to include: Multi-static processing, Bottom Reverberation, Biologic Clutter, and Surface Scattering models, as well as the RADAR, ESM and MAD non-acoustic sensors for the P-3 ASW tactical nucleus (Pilot, TACCO, SS1-3). The innovative development of the IEER training capability provides the P-3 aircrew with vastly enhanced ASW training not previously available.

The PACT3 utilizes COTS hardware and flight simulation software along with Government furnished aircraft software. The PACT3 utilizes the aircraft Tactical Mission Software (TMS) and Airborne Operational Program (AOP) and allows for easy upgrade to the latest Fleet software releases. Recent enhancements/upgrades include Multi-static Active Coherent (MAC) processing and an Anti-Surface Warfare (ASUW) Strike (AGM-84 Harpoon) training capability, further extending the benefit of the PACT3 training system.

The availability of a deployable, high-fidelity training system that has the capability of being fully integrated with others within the Navy Continuous Training Environment (NCTE) synthetic battle space will make relevant training attainable by P-3 crews while forward deployed.

PACT3 training systems have been delivered to five overseas P-3 deployment AORs, in addition to two CONUS, and one OCONUS homeport locations.

DEPOT LEVEL MAINTENANCE, ENGINEERING, AND LOGISTICAL SUPPORT SERVICES

NAWCTSD provides contract administration to various NAVAIR customers and several Fleet Readiness Centers who provide vital services in performance of Depot Level Maintenance (DLM), Engineering, and Logistical support. Services are performed for Navy, Marine Corps, and partner nation's aircraft, aircraft engines, and associated components/materials, involving the rework of existing aviation end items, systems and components and the manufacture of items and component parts that are otherwise not available. The services also include modernization, conversion, in-service repair, disassembly, and all other categories of aircraft DLM. The types of aircraft and associated aircraft

components requiring maintenance include EA-6B, E-6B, F/A-18, F-5, H-1, H-53, H-60, P-3, E-2, C-2, S-3, T-6, T-34, T-44 and T-45.

DISTRIBUTED TRAINING NETWORK GUARD (DTNG)

The DTNG, Category I Advanced Technology Demonstration (ATD) program provides a Cross Domain Solution (CDS) application for training exercises. The DTNG Program developed the capability that allows training systems operating at different security levels to interoperate within a common synthetic environment, enhancing the capability to support full spectrum mission training and rehearsal.

The DTNG System consists of three subsystems – the Bridge, the Gates and a rule set generation application. The Bridge and the Gates, working in concert, support two-way data transfer between training events operating at different security levels. The rule set generation application is a stand-alone system that is used for the development of the security reclassification rules called upon by the DTNG when adjudicating the data flow.

DTNG is a government-owned CDS which enables CDS enhancements for short turnaround times. DTNG is being developed in synergy with the Air Force (AFAMS, DMOC), Army (KORCOM), Joint Staff (JS) J7, Test Resource Management Center (TRMC) and the Navy (NAWCTSD), with NAWCTSD leading the development teams. DTNG provides an economical first step in establishing Cross Domain Information Sharing (CDIS) enterprise services. DTNG supports multiple training protocols including High Level Architecture (HLA 1.3); Joint Live Virtual Constructive (JLVC) 1516e; Distributed Interactive Simulation (DIS 6); and the Test and Training Enabling Architecture (TENA).

Working with JS J7, DTNG is designed to meet Joint Enterprise

requirements by providing a capability to conduct Coalition unit, joint, and theatre level training exercises at reduced cost.

FIELDIED TRAINING SYSTEMS SUPPORT (FTSS)

FTSS programs are typically fleet OMN funded, competitively awarded performance based service contracts. These services include day-to-day support operating training devices under Contractor Operation and Maintenance Services (COMS) where tasking includes simulator operations and maintenance, facility access control, and custodial services. Contractor Instructional Services (CIS) provides on-site personnel for instructor led training. Instructional Systems Development (ISD) contracts provide services for curriculum Revision and Maintenance (R&M). Command Aircraft Crew Training (CACT) contracts are used when a commercial training class meets government requirements (e.g. qualifying a Navy pilot to fly a Gulfstream 550 in a commercial flight school).

HC144A OPERATIONAL FLIGHT TRAINER (OFT)



The HC144A Operational Flight Trainer (OFT) supports the U.S. Coast

Guard's Search and Rescue mission. The OFT is a level D trainer with a 290-degree x 60-degree glass display system. The nine LED projectors sitting atop the OFT provide exceptional brightness and 10:1 contrast. The system supports Coast Guard flights in many locations with image databases for the west coast, the east coast, Texas, and the Southeast United States. NAWCTSD collected and used flight data to create the aero model. The cockpit also provides night vision goggle stimulation and a customer focused Instructor-Operator station.

HC144A RECONFIGURABLE FLIGHT TRAINING DEVICE (RFTD)

The HC144A Reconfigurable Flight Training Device (RFTD) provides cockpit procedures training for U.S. Coast Guard pilots. The device was used for hardware/software integration then tested to ensure the flight characteristics were similar to the OFT. The RFTD uses the same Instructor/Operator station and the same software and databases as the HC144A OFT.

INTELLIGENT TUTOR AUTHORIZING AND DELIVERY SYSTEM (ITADS)



ITADS is a Research and Development (R&D) project that utilizes intelligent tutoring concepts to create a better trained IT "A" school student.

ITADS research will further the understanding of authoring and delivery of instructional content using intelligent tutoring systems and methods. ITADS initially focuses on Information Technology (IT) instructional content. ITADS is being developed with a robust authoring system that can be utilized by Subject Matter Experts (SMEs) and instructors to facilitate expedient content delivery by IT schoolhouse personnel.

Navy instructors are provided with the tools they need to develop, modify, and deliver effective intelligent instructional content for their students. Students who complete ITADS training will apply the six-step troubleshooting method and solve new IT-related problems better than students who have not completed the ITADS training. While student evaluations are limited during the period of this effort, continued evaluation will occur after product delivery. The initial goal for this effort is to create five student stations utilizing the new technology that will replace six days of the current course of traditional instruction.

NAVAL AVIATION PROFICIENCY MODEL (NAPM)

The Naval Aviation Enterprise (NAE) is seeking to optimize training and increase the efficiency across all of its platforms. Amid shrinking budgets and asset constraints, the NAE is experiencing an increase in requirements and complex mission sets encompassing all platforms. In a response to this demand, NAWCTSD has developed a Naval Aviation proficiency model (NAPM) to assist decision makers on how best to optimize the training for all aviators. The model takes into account many factors including aviator experience, the quality of the instruction, and the type of media used for training. The model uses these factors to predict the impact on individual proficiency of any proposed

NAE initiatives prior to implementation into the training curriculum. The purpose of the model is to optimize the flight time that aviators receive in the aircraft, and maximize the individual proficiency of each aviator. NAPM, along with other NAE initiatives, will help build the framework for the future of Naval aviation training.

NETWORK EFFECTS EMULATION SYSTEM (NE2S)

The Test and Evaluation (T&E)/ Science and Technology (S&T) Net-Centric Systems Test (NST) program exploits new technologies and processes to meet important T&E requirements; expedites the transition of new technologies from the laboratory environment to the T&E community; and leverages commercial equipment, modeling and simulation, and networking innovations to support T&E. One of the T&E technology gaps is the inability to simulate and analyze network effects within joint context to create, instrument, and analyze the impact effects on shared situational awareness in a net-centric environment.

The NE2S provides the T&E/ Net-Centric Systems Test (NST), and Training and Experimentation (T&E) communities with a cost-effective enterprise tool capable of simulating a wide range of network and host-based effects that can be centrally managed and controlled. Effects are initiated, managed, and terminated using a Master Control Station (MCS) communication to Effects Generator(s) (EG). Effects occur on user workstations without affecting network traffic and can be synchronized with Master Scenario Event Lists (MSEL). NE2S does not affect real-world networks and only emulates desired effects through the Effects Generation Software Application (EGSA) middleware application downloaded on specific exercise systems. The NE2S software provides support to various distributed sites and

terminal/systems. By simulating network and host based effects, NE2S enables the Testing, Training and Experimentation communities to create a wide range of conditions under which applications and systems can be tested (i.e., Cyber for Cyber) improving event reality. NE2S provides realistic training capability during events or exercises whether local or distributed.

The NE2S software affords the user a fast and easy means of setting up and executing a scenario, as well as making adjustments of varying scope during an active exercise. NE2S helps exercise designers, planners, and Operating Forces (OPFOR) provide training in a degraded cyber environment. The application is installed on exercise identified systems shortly before the start of an exercise and is removed when the exercise is complete. During an exercise, the effects can be terminated in seconds either manually or through a failsafe feature.

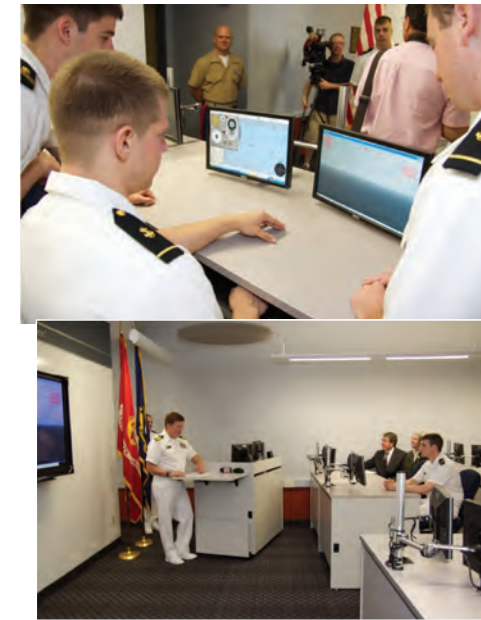
NE2S currently can provide 15 total effects, which include seven network and eight host-based effects. NE2S is capable of inducing multiple or isolated effects to groups or individual systems. NE2S commands are Public Key Infrastructure (PKI) encrypted.

NE2S is accredited to operate on Non-Classified Internet Protocol Router (NIPR) Networks and Secret Internet Protocol Router (SIPR) Networks.

NAVAL RESERVE OFFICER TRAINING CORPS (NROTC) MARINER SKILLS SIMULATOR (MSS)

The Naval Reserve Officer Training Corps (NROTC) Mariner Skills Simulator (MSS) program was launched in September of 2007, following the combined installation of MSS and COVE at Jacksonville University in Jacksonville, Florida.

The MSS provides a configurable, scalable, and expandable training system to support NROTC navigation



training requirements. The MSS software facilitates experiential learning opportunities for students in the areas of navigation, ship handling, basic seamanship, and Naval

operations through the use of real-time computer-enhanced modeling and simulation. The MSS is currently being utilized at 37 NROTC units located at various universities throughout the United States.

The MSS software was specifically designed and developed by NAWCTSD for Navy Schoolhouses and the MSS classrooms. These classrooms allow NROTC midshipmen the ability to train with the same tools they will be using when they arrive in the fleet. This prepares them to immediately function in the modern shipboard environment once they receive their commissions as Navy ensigns. The MSS classrooms represent the incorporation of technology into existing instructor-led curriculum to enhance the learning experiences of future Navy and Marine Corps officers.

INTERNATIONAL PROGRAMS

The Program Director for International Programs (PDI) manages training programs, systems and products to support the training needs of our international partners. PDI leverages the experience, knowledge and resources of the other Program Directorates to deliver equivalent training solutions that are provided to the U.S. Navy Commands. To this end, PDI is currently supporting approximately 40 partner nations, and providing training solutions across the full spectrum of NAWCTSD products. PDI is the primary training systems point-of-contact for the Defense Security Cooperation Program, distributing policy guidance and standardized procedures in the execution of Foreign Military Sales (FMS) cases. In addition, PDI coordinates foreign disclosure, export licensing and foreign visit requests for the command, as well as partnering with the Navy International Program Office (Navy IPO) in the development of responses to Price and Availability (P&A) and Letters of Request (LOR) from our international partners.

PROGRAMS IN THE INTERNATIONAL PROGRAMS DIRECTORATE

The International Programs Directorate is the action agent for the full range of NAWCTSD's air, surface, undersea, and special mission training systems for international partners of the United States. The following are just a few examples of the Directorate's successful overseas programs.

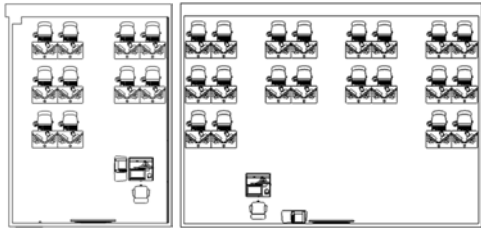
ROYAL AUSTRALIAN AIR FORCE P-8A OPERATIONAL FLIGHT TRAINER (OFT)



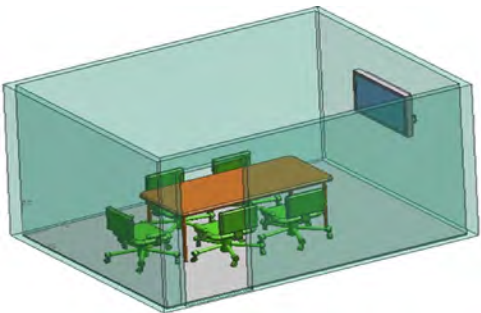
The P-8A Poseidon Operational Flight Trainer (OFT) is a full-motion, six-degree-of-freedom (DoF) flight deck simulator. The OFT consists of

a motion base, a high-fidelity reproduction of the P-8A (Poseidon) cockpit, a visual system to provide Out-The-Window (OTW) display, an aural cue system to reproduce cockpit noises and alarms, and an Instructor Operator Station (IOS) for simulation control and monitoring and recording of student performance.

The OFT simulates the systems, equipment, and features of the P-8A Poseidon aircraft flight deck as well as the performance characteristics of the P-8A Poseidon aircraft. Similar to the Wedgetail simulators, the Australian P-8A Simulators will be certified to conduct zero-flight hour training.

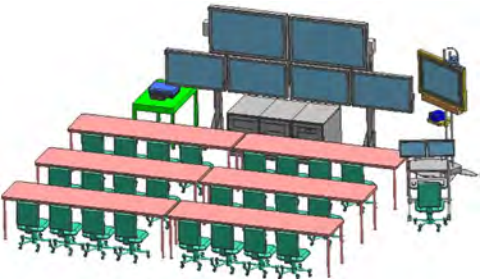


P-8A Electronic Classrooms – 10 man and 20 man (notional)



P-8A PLT Brief/Debrief Room

The PLT Brief/Debrief Station (BDS) supports the simultaneous briefing/debriefing (standalone scenarios only) of up to five people during a training event. Instructors will be able to access student grade sheets with the ability to play back a particular set of recordings stored on the TSSC. The screen layout is instructor-selectable with instructors able to display actual values against target values along with a composite display including cockpit video, cockpit instrumentation, and various simulator parameters.

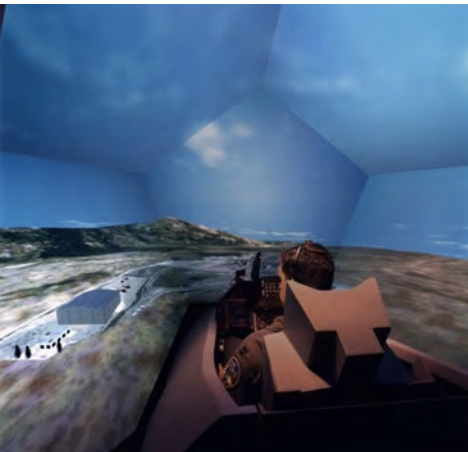


Mission Systems Brief/Debrief Room

The Mission Systems Brief/Debrief room (BDS) facilitates instructor control and evaluation to brief/debrief up to 24 people. The Mission Systems BDS will have the ability to play back at least four (4) recorded video feeds simultaneously, and time synchronized with recorded source video channels during playback dynamically selectable.

Any point within a recorded training event is accessible with the speed of play back variable. Additionally, instructors can specifically mark events that can subsequently be jumped to during debrief. The system is capable of displaying mission plans and replaying recorded student performance data. Both audio and video will be recorded.

F/A-18E/F BLOCK II TACTICAL OPERATIONAL FLIGHT TRAINER (TOFT)



The F/A-18E/F TOFT provides a realistic training environment for the pilot and Weapons System Operator (WSO) in the areas of flight, navigation and communications peculiar to the F/A-18E/F aircraft. The training system promotes initial qualification, transition, requalification proficiency and tactical flight training under instrument flight conditions. The operational flight training objectives include cockpit familiarization and an in-depth understanding of the F/A-18E/F flight characteristics, normal procedures and emergency procedures.

TOFT is a fully simulated replica of the F/A-18E/F cockpit. It is a completely operational flight trainer that has a nine-panel HD-9 visual system, night visual system, and an audio system. All this is achieved at a cost significantly lower than training on the actual aircraft.

Components:

- Cockpit
- Visual System
- Computing Assets
- Instructor/Operator Station (IOS)
- External CGF
- Software
- Brief/Debrief System/Mission Operation Center (BDS/MOC)

LOW COST TRAINER (LCT)



The LCT is used for cockpit familiarization and procedures trainer. Compared to a TOFT, this device can be rapidly and cheaply updated to current OFP.

F/A-18E/F INTEGRATED VISUAL ENVIRONMENT MAINTENANCE TRAINER (IVEMT)



The F/A-18E/F IVEMT provides a sophisticated maintenance training system that supports both initial and proficiency training.

IVEMT is a fully simulated replica of the F/A-18E cockpit. It has two Student Aircraft Interface Trainer Station (SAITS) screens to visualize maintenance system, night visual system, and an audio system. All this is achieved at a cost significantly lower than training on the actual aircraft.

The ASH IVEMT is capable of allowing students to support the necessary requirements for O-level maintenance training and troubleshooting on the aircraft Avionic and ECS systems and related components. This capability consists of but is not limited to:

- O-level testing
- Operational checkouts
- Safety precautions and procedures
- Malfunction troubleshooting
- Malfunction identification and/or correction of the applicable system

The instructor, by way of the IOS, has the ability to insert malfunctions to initiate troubleshooting training utilizing the ASH IVEMT and the applicable ASH F/A-18 Interactive Electronic Technical Manual (IETM). These malfunctions can be active, initiated one fault at a time, or up to five faults simultaneously.

F/A-18C DEPLOYABLE TACTICS TRAINER (DTT) AIRCREW TRAINER



The F/A-18C Hornet Deployable Tactics Trainer (DTT) provides a realistic, networked, scalable, full-spectrum combat training environment for pilots. The DTT environment provides a distributed simulation mission space that allows aircrew to receive, process, and transmit commands and information. DTT devices consist of integrated workstations and elements that simulate the actual aircraft avionics, weapon systems, friendly and opposing forces, as well as command and control components. DTT systems are divided into four distinct development segments. They are (1) Virtual Simulated Cockpit,

(2) Instructor Operator Station (IOS) shared with, (3) Weapons Server and (4) Visual System. The DTT is interoperable with and shares software and visual system with the WTSAT/DBMOC. The PC-based DTT along with its modular software architecture, maximizing off-the-shelf cost effectiveness and reuse facilitates technology insertion and simulator/aircraft concurrency.

F/A-18C DE-BRIEF MISSION OPERATION CENTER (DBMOC)



The F/A-18C Hornet De-Brief Mission Operation Center (DBMOC) provides a realistic, networked, scalable, full-spectrum combat training replay environment for WTSAT/DTT mission review to enhance training. The DBMOC provides a replay environment for up to eight aircraft (WTSAT/DTT) simultaneously. DBMOC devices consist of integrated workstations which can also be used as an IOS. The DBMOC is interoperable with and shares software with the WTSAT/DTT.

F/A-18C WEAPONS TACTICS AND SITUATIONAL AWARENESS TRAINER (WTSAT) AIRCREW FLIGHT TRAINER

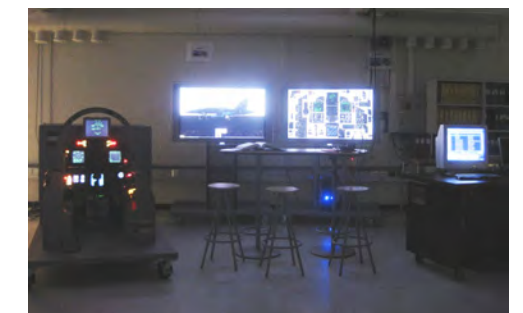
The F/A-18C Hornet Weapons Tactics and Situational Awareness Trainer (WTSAT) provides a realistic, networked, scalable, full-spectrum combat training environment for pilots and Naval Flight Officers. The WTSAT

environment provides a distributed simulation mission space that allows aircrew to receive, process, and transmit commands and information. WTSAT devices consist of integrated workstations and elements that simulate the actual aircraft avionics, weapon systems, friendly and opposing forces, as well as command and control components. WTSAT systems are divided into four distinct development segments. They are (1) Simulated Cockpit, (2) Instructor Operator Station (IOS), (3) Weapons Server and (4) Visual System. The PC-based WTSAT along with its modular software architecture, maximizing off-the-shelf cost effectiveness and reuse facilitates technology insertion and simulator/aircraft concurrency.



F-18C Weapons Tactics & Situation Awareness Trainer

F/A-18C SIMULATED AIRCRAFT MAINTENANCE TRAINER (SAMT)



The F/A-18C Hornet Simulated Aircraft Maintenance Trainer (SAMT) provides realistic, networked, simulated aircraft maintenance training. The SAMT provides a realistic environment for power up, troubleshooting, WRA removal and replacement. SAMT



devices consist of integrated Student workstations, Instructor Operator Station, and hardware cockpit. The PC-based SAMT along with its modular software architecture, maximizing off-the-shelf cost effectiveness and reuse facilitates technology insertion and simulator/ aircraft concurrency.

F/A-18C SIMULATED AIRCRAFT MAINTENANCE TRAINER (SAMT) PORTABLE

The F/A-18C Hornet Portable Simulated Aircraft Maintenance Trainer (SAMT) provides realistic, networked, simulated aircraft maintenance training. Portable SAMTs are utilized in the classroom environment and integrated into the lesson plans. The SAMT provides a realistic environment for power up, troubleshooting, and WRA removal and replacement. SAMT devices consist of integrated Student workstations, Instructor Operator Station, and hardware cockpit. The PC-based SAMT along with its modular software architecture, maximizing off-the-shelf cost effectiveness and reuse facilitates technology insertion and simulator/aircraft concurrency.

E-2C AIRCRAFT OPERATIONAL FLIGHT TRAINER (OFT)



The E-2C OFT provides a realistic training environment for the pilot and co-pilot in the areas of flight, navigation and communications peculiar to the E-2C aircraft. The training system

promotes initial qualification, transition, requalification proficiency and tactical flight training under instrument flight conditions. The operational flight training objectives include cockpit familiarization and an in-depth understanding of the E-2C flight characteristics, normal procedures and emergency procedures. This E-2C OFT is a fully simulated replica of the E-2C cockpit. It is a completely operational flight trainer that incorporates a six-degree-of-freedom motion system, four-window dusk/night visual system, and an audio system. All this is achieved at a cost significantly lower than training on the actual aircraft.

E-2C TACTICS TRAINER (TT)

The Tactics Trainer is a weapon system simulator which provides crew member training in the unique and complex weapon system characteristics of the E-2C aircraft.

The TT simulates the CIC compartment of the E-2C Hawkeye aircraft. The Hawkeye is an all-weather, long range radar AEW aircraft used to detect and electronically observe potential and real threats. Through the use of the weapon system, the aircrew can vector interceptors into a close-in surveillance and/or attack position, and provide strike control, traffic control, area surveillance, search and rescue guidance, navigation assistance, and communications relay services.

The TT represents the Group (GRP) II and Navigation (NAV) upgrade configuration of the E-2C AEW system. The GRP II and NAV upgrade weapon system configuration includes the incorporation of the Joint Tactical Information Distribution System (JTIDS), AN/APS 145 Radar, Improved Identification Friend or Foe (IFF), and Global Positioning System (GPS). The trainer also includes state-of-the-art instructor operator stations using touch screen technology for system operation and data input.



E-2C PILOT TRAINING

Pilot simulator training is offered to FMS students at Norfolk Naval Station, Virginia, and is taught by the same experienced instructors that teach USN E-2C pilots. Classroom instruction consists of thirty-five hours of lectures on the following systems: electrical, fuel, propeller, hydraulics, flight controls, and communications. Simulator training consists of forty-five hours of events ranging from the familiarization phase to Advanced Instrument phase and reinforces systems knowledge through the practicing of all NATOPS emergency procedures.

KC-130 TRAINING AND COURSEWARE SERVICES

We can provide and perform various types of instruction in integrated ground and flight, and aircraft maintenance for all C-130 programs and tailor it specifically to the customer's mission and procedures. We can prepare and develop Contractor instructor guides and student guides for Aircrew and Maintenance training. Maintenance training can consist of Organizational ("O") rates and authorized Intermediate ("I") level billets. All training material can be provided in USN, USMC, or contractor format and in the English language. The student guides can be provided to students upon completion of the training to help develop our foreign customers' own training programs and we can also develop them for our customers as well. As well as formal training in classrooms, simulators and aircraft, all these forms can be reinforced with practical on-the-job training.

BOAT CREW AND GUNNERY TRAINER

Boat Crew and Gunnery Trainer consists of an immersive training environment that places sailors in a

geo-typical or geo-specific virtual world. This training environment effectively trains sailors on a variety of crew level operational tasks and extremely realistic waterborne gunnery. The advanced training courseware of Virtual Battlespace 2's Tactical Weapon Simulator (VBS2-TWS) combined with exclusive high-fidelity crew served training weapons, delivers the most realistic and immersive conditions possible in a training environment. The system features:

- On-board systems for radar, ship-to-shore, and on-board position-to-position communication
- Currently in use with Naval Expeditionary Combat Command (MESGs 1 and 2)
- Increase gunner proficiency in a realistic, full-motion environment
- Conduct day or night afloat training missions
- Optional on-board systems for radar ship-to-shore communications and complete crew communication system



PORTABLE SMALL ARMS TRAINING SIMULATOR (PSATS)

PSATS system brings all the capability of a small arms training simulator to the user in a portable platform. The PSATS package condenses the simulator systems hardware into a mobile package which brings an installed lanes simulator down to a "one-man carry" portable

system or networked with other PSATS when incorporated with Laser Shot's Instructor Control Station (ICS).



PSATS is a one-man portable and accessible, fully contained firearms training simulator for units and individuals in any location weighing only 33 pounds with the small dimensions of 22x22x10 inches. All critical system hardware (hit detection camera, computer, keyboard, mouse, speakers, and HASP key) are mounted in fixed positions inside the hard plastic carry case on a sliding rack for easy accessibility and to withstand shipping "drop tested" requirements. Essentially, the system can be shipped as is, if necessary, and is a single power cord "plug and train" system setup.

The PSATS software packages can include military or law enforcement courseware. The PSATS system also includes a portable tablet computer for remote instructor control of the training system.

Advantages:

- Improved marksmanship, judgment, gun handling, and mindset skills
- Realistic size, weight, and feel of actual weapons
- Recoil and inert weapons purchase options for virtually all modern small arms weapons
- Immediate feedback
- Customizable simulated ranges and targets
- Virtual bullets allow necessary trigger time without added ammunition costs
- Doctrine-based courseware
- Trainers can observe and help improve shooters' skills during all facets of training

ENGINE ROOM TRAINER (ERT)



The ERT is designed to be for individual and sub team training of engine control room watch keepers. The ERT will support the following types of propulsion plant training:

- Propulsion plant start-up and shut-down
- Normal underway operations
- Abnormal and casualty condition response
- Emergency procedures

The ERT simulator can be used in conjunction with classroom lessons, reinforcing theory and systems knowledge obtained during lectures with performance-based skills training and practice. The ERT propulsion plant simulation will be capable of being integrated with the FMBT to conduct integrated watch team training.

The ERT provides a realistic training environment by replicating the Engine Control Room (ECR) layout and providing "as fitted" operator interfaces including control system panels, communications and alarms. These interfaces will consist of equipment replications that represent the form, function and spatial location of actual configurations fitted in the ECR.

The ERT consists of an instructor control station for managing the simulation training, and panel control interfaces and interior communications for manual simulation and instructor role play.

The ERT is comprised of the following components:

- Engine room control station mockup room

- Main diesel engine and gearbox control and monitoring console
- Propulsion plant dynamic simulation and associated interfaces to stimulated ECR equipment
- Alarm panels
- Bulkhead mounted items
- Interior communications circuits

CANNON FIRE CONTROL TRAINER (FCT) FOR IRAQI NAVY



The FCT is designed to support the following training:

- Individual training
- Team training

The FCT simulator is a classroom based training system which employs a standard SEAHAWK A2 Remote Operators Console (ROC).

The FCT simulator provides a realistic operational experience including simulated function of the gun and tracking and fire control ballistics capability.

In addition to providing accurate response to operator control inputs, the FCT simulator incorporates many variables to provide a truly accurate simulated environment including:

- Multiple target types (Jet skis through to large vessels)
- Realistic target maneuvering
- Own ship maneuvering
- Dynamic sea states
- Environmental effects
- Land masses/representation of geographic areas

The simulator produces real-time video sequences from a computer-generated synthetic camera viewing a 3D scene, which fully responds to the standard SEAHAWK A2 Remote Operator Console controls including the simulated function of the Electro Optical Director.



RESEARCH AND TECHNOLOGY



RESEARCH FOCUS I:

HUMAN PERFORMANCE MODELING & ASSESSMENT (HPMA)

The Research and Technology Program Office (4.6T) manages the NAWCTSD training science and technology and research and development programs. These include the Office of Naval Research (ONR) sponsored programs in Basic Research (BA-1), Applied Research (BA-2), Advanced Technology Development (BA-3), Small Business Innovative Research (SBIR)/Small Business Technology Transfer (STTR), Transition Research, the Navy Science Advisor Program (ONR Global Fleet/Forces), and the Command's Technology Transfer Program. Under the cognizance of 4.6T, NAWCTSD maintains a very rigorous Human Research Protection Program (HRPP). Under the HRPP there is an Institutional Review Board that reviews all research and experimentation that involves the use of human subjects. 4.6T also manages NAWCTSD non-Navy sponsored research and development in support of commands and agencies such as Joint Forces Command, Department of Homeland Security, TRICARE Management Activity and Defense Equal Opportunity Management Institute (DEOMI). Exemplar projects for 4.6T's four research focus areas are provided below.

Human performance modeling analyzes underlying Knowledge, Skills and Abilities (KSAs) to predict performance across a variety of systems and contexts. Human performance assessment includes the ability to accurately measure and analyze performance on domains ranging from simple procedural skills to complex cognitive skills in individuals, teams, and organizations. Better modeling and assessment technologies and techniques will enable future training systems to account for differences in aptitude and learning style, permitting training to be tailored to the needs of specific individuals and teams.

ELECTRONIC WARFARE TACTICAL DECISION AID



The goal of this training capability is to utilize warfare tactical aides, decision tools, gaming or analysis tools to improve electronic warfare performance in shore trainers, as well as in ships or submarines independent of environmental or geographical location restrictions. Additionally, the goal of the project is to provide an adaptive training component to address individual skill deficiencies, potentially leading to faster skill acquisition.

PERFORMANCE ASSESSMENT TRENDS IN TRAINING ENHANCING READINESS REPORTING FOR NAVAL SYSTEMS (PATTER2NS)

The objective of PATTER2NS is to increase training effectiveness and efficiency through improved automated performance measurement, post mission reporting and trend tracking. These enhanced capabilities will: 1) Increase readiness through integration of automated performance measurement and trend analysis technologies, 2) Reduce workload by designing user interfaces with sound human factors consideration for displaying performance measurement results, mission summaries, and performance trends, and 3) Support a wide variety of platforms with a flexible display architecture that is extensible to other contexts. Initial application domain is the P-8A aircraft but other Anti-Submarine Warfare (ASW) platform applications are also planned for the MH-60R/S, Triton, and F/A-18.



RESEARCH FOCUS II:

HUMAN
SYSTEMS
DESIGN AND
DECISION
SUPPORT

Significant advances in Naval capabilities, such as the increased numbers and types of sensor systems, the use of multiple autonomous vehicles, and the increased flow of intelligence information, present a significant challenge for our Warfighters. The purpose of Human System Design and decision support research is to advance the state of the art in automation and artificial intelligence in support of decision-making and mission planning to reduce stress and information overload while increasing consistency and confidence in decisions.

UNMANNED AERIAL SYSTEM
COMMON CONTROL
STATION PROTOTYPE-BASED
TRAINING RESEARCH



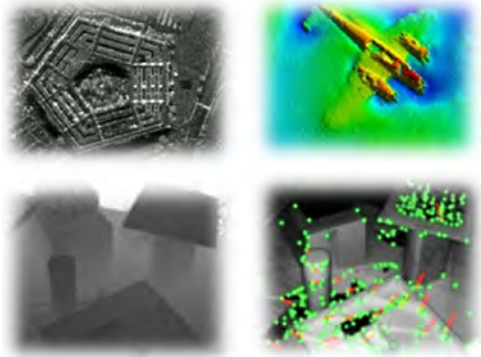
To meet the demand for cost effective training for Unmanned Aerial Systems (UAS) operators, research and development on embedded training approaches for future UAS systems requires a Common Control System (CCS) prototype to ensure effective transition to operational systems. This prototype must be used to design, develop, and evaluate competing embedded training approaches.

Software will be developed using UAS control segment architecture, systems support sub-domain. An additional objective is to enable integration of Navy resources to support PMA-281s CCS development. The primary focus of the proposed effort is to develop and evaluate embedded training approaches for the employment of the CCS.

DECISION MAKING FOR
HUMAN-MACHINE
COLLABORATION IN
COMPLEX ENVIRONMENTS

The goal of this effort is to investigate how to effectively combine large amounts

of disparate data into a manageable format that enhances Unmanned System operator performance. This format must support the quick synthesis and transformation of data into actionable information that aids operator Decision Making (DM) in complex environments. This research focuses on operators from multiple Intelligence, surveillance and reconnaissance platforms that directly interact with disparate data (e.g., sensors, communications, etc.) that may be vague or incomplete to meet mission objectives. Thus, it is important to understand mission specific information processing requirements, task demands, and other characteristics associated with interpreting such data. This approach includes the triangulation of cognitive psychology, decision theory, and machine learning methods into a unified DM framework. This comprehensive approach will provide guidance for system development that enhances operator DM through automation, data integration, and enhanced visualizations.

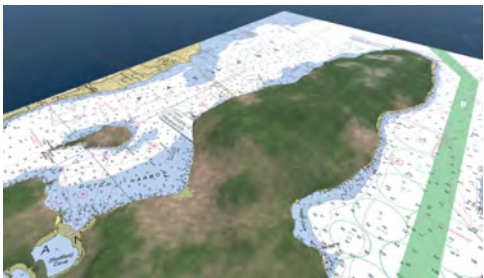


RESEARCH FOCUS III:

VIRTUAL
ENVIRONMENTS
& TRAINING
TECHNOLOGY

Virtual Environments (VEs) can augment Warfighter preparedness by providing training opportunities that might not be available due to factors such as cost, safety, and resources. Three components of VE training must be addressed for it to become a more viable training solution: 1) the technology, 2) the human, and 3) the evaluation. The technology component includes the ability to provide realistic rendering and modeling, multi-sensory input/output devices, and system interconnectivity and delivery. The human component includes the ability to train at different levels of task performance from motor skills to complex cognitive skills while taking into account user interaction issues and individual differences. The evaluation component involves assessing the effectiveness of the VE training system via formalized training effectiveness evaluations, transfer of training, and training fidelity.

EXPLORING THE USE
OF VIRTUAL WORLD
APPLICATIONS FOR
MILITARY TASKS



NAWCTSD, in collaboration with the U.S. Army Research Lab, Simulation and Training Technology Center, and Virtual World Strategic Applications Group, is developing a distributable virtual environment in support of individual Combined Enterprise Regional Information Exchange System (CENTRIXS) training utilizing the Army's Military Open Simulator Enterprise Strategy (MOSES) virtual environment. This effort will provide Tactical Training Group Atlantic (TTGL) with a CENTRIXS Virtual World (VW) training tool in support of Joint

Operation Fleet Synthetic Training (FST) events, and evaluate the effectiveness of the CENTRIXS VW training tool compared to that of the traditional CENTRIXS training.

SCENARIO PLANNING AND
EFFECTS CONTROL SYSTEM
AND AFTER-ACTION-REVIEW
TECHNOLOGY



The need exists for flexible and cost-affordable scenario control and After-Action-Review technologies for highly immersive, tactical training environments designed around the concept of the instructor as the operator. The NAWCTSD Weapons Simulation and Integration Lab has developed and evolved a Scenario Planning and Effects Control System that enables instructor/operators to provide highly detailed and repeatable immersive tactical ground force training scenarios by defining combinations of cause/effect, time, and manual trigger actions between various types of sensor and environmental stimuli for increased training effectiveness, trainee



immersion, and reduced instructor/operator workload. The architecture utilizes a combination of government and commercial off-the-shelf components providing for a high degree of flexibility and sustainability.

Data integration with commercially available digital video management and debriefing systems enables event-based navigation and remediation support during After-Action-Review.

RESEARCH FOCUS IV:

DISTRIBUTED LIVE, VIRTUAL & CONSTRUCTIVE SYNTHETIC TRAINING

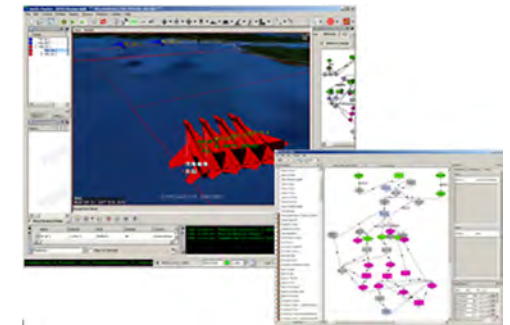
The Naval Science and Technology Strategic Plan cites the need for optimized physical readiness and enhanced cognitive performance as well as immersive, synthetic systems for training and education. The ability to train and interact in a large-scale distributed simulation network is critical to DOD and allied partners to allow warriors to interact, train, and learn in an operationally realistic environment.

LIVE, VIRTUAL & CONSTRUCTIVE (LVC) TRAINING



The objective of the Live, Virtual, and Constructive Training Fidelity (LVC TF) Enabling Capability is to push the state-of-the-art and science in three key ways: 1) Understand the impacts of merging virtual and constructive entity representations onto avionics displays on safety and training; 2) Understand the fidelity necessary to achieve more Training and Readiness (T&R) in virtual simulators; and 3) Develop constructive Semi-Automated Forces (SAF) that demonstrate tactically realistic and learner aware behaviors. The payoffs of this program are the ability to enhance fleet readiness, lower total ownership costs, improve safety, and reduce security risks. The figure above illustrates the integrated nature of the program, which is key to identifying and mitigating the seams associated with LVC training environments. This program is sponsored by the Office of Naval Research under the Future Naval Capabilities Program.

DYNAMIC ADAPTIVE AND MODULAR ENTITIES FOR UNMANNED AERIAL SYSTEMS



The objective of this effort is the development of tools, standards and guidelines to generate large numbers of realistic semi-automated force (SAF) behaviors in a format that can be integrated into the Navy's Next Generation Threat System (NGTS). Typical simulation-based training for aviation requires the integration of hundreds, if not thousands, of simulated entities into the overall training scenario. Developing these entities requires significant time and effort and results in entities whose behaviors are strictly guided, scripted, and limited based on pre-determined rules that define the entities' behaviors over the course of the training scenario. The approach is to replace hand-coded rule sets with a capability to automatically generate new and appropriate SAF behaviors from one or more data sources. This approach will integrate cognitive modeling approaches with machine learning techniques to generate tactically authentic behaviors, which will then be validated in terms of authenticity, reduced time to develop and improved training value. The team will also develop standards and guidelines to integrate SAF behaviors into NGTS.



DOING BUSINESS WITH NAWCTSD



CUSTOMERS

The Program Directors (PDs) are responsible for accepting and executing projects assigned to NAWCTSD. The primary point of contact will be the Program Director responsible for the warfare area most closely aligned with the customer. Accordingly, all work is assigned to one of the PDs (i.e., Aviation, Surface, Undersea, Cross Warfare, International, Research and Technology).

Those work assignments may reach NAWCTSD through a variety of methods. The most common approach for Navy customers is via the Systems Commands (Naval Air Systems Command-NAVAIR, Naval Sea Systems Command-NAVSEA, and Space and Naval Warfare Systems Command-SPAWAR). In those cases, the Chief of Naval Operations (OPNAV) resource sponsor determines the validity and relative need of a respective task, allocates resources, and tasks the appropriate Systems Command (SYSCOM) to manage the project. In turn, the SYSCOM tasks NAWCTSD to execute the task (for example, the acquisition of a new helicopter trainer, or conduct a training skills and requirements analysis for a new ship class). The mechanism for gaining access in this method is to elevate the requirement through the applicable operational chain of command to obtain the OPNAV resource sponsor's support.

Direct access is the second most common method. Customers (Navy Program Executive Officers-PEOs/Program Managers-PMs; Sister Services; Non-DOD Training Agents) may request NAWCTSD directly to support their respective needs. Allied military may also access us with a letter of request from their embassy to the Navy International Programs Office. This avenue is typically conducted on a reimbursable basis where the customer provides requisite resources direct to NAWCTSD to enable project execution. Resources include project funds, travel funds, and in-house salary funds. Key components include available skill mix and the necessary depth of skills.

TRAINING SUPPORT CONSIDERATIONS

To understand your request for training support from NAWCTSD we will typically ask the following type of questions:

1. General Information

- Command
- Primary Point of Contact (POC)
- Mission
- Funding Sponsor
- End User Primary Command or Organization
- End User Primary POC
- Sustainment Sponsor (if applicable)
- Project Description
- Source of Requirement
- Level of Security Classification

2. Budget Information

- Funding Type
- FY Available
- Funding Expiration Date
- Funding Amount



3. Characteristics

- a. Relationship of requirement to other training systems, devices or courses in the achievement of the learning objectives
- b. Current Training Hours by Delivery Method
- c. Student Throughput
- d. Support Requirements
- e. Known Program Constraints/Risk
- f. Environmental Issues

4. Delivery or Training Sites and Facilities Information

- a. Number of Sites
- b. Location(s)
- c. Building Number(s) (if applicable)
- d. Room(s) (if applicable)
- e. Installation Impact
- f. Additional Facilities Required (if applicable)

5. Requested Products and Processes

- a. Training Devices and Simulators
 - i. New Effort or Modification
 - ii. Type of Training (Part Task; Team; Tactical; Operators; Maintenance; FST Capable; Weapon Range; Mission Planning; CBT; Other)
 - iii. Type of Effort (Trainer Functional Upgrade; Trainer Maintenance Upgrade; Trainer; Repair; Software Upgrade; Electronic Classroom Upgrade; Trainer Relocation; Parts Buy; Learning Resource Center Upgrade; Disposal of Training System; Embedded Training in Op Equipment; Other)
- b. Training Content
 - i. Training Delivery System (Intranet; MarineNet; Internet; Army On-Line; NMCI; NKO; Other)
 - ii. Courseware Development
 - iii. Curriculum
- c. Services
 - i. Contract Instructor Services
 - ii. Contractor Support Services
 - iii. Procurement of Government Services
 - iv. Contractor Operation and Maintenance Services (COMS)/Fielded Training System Support (FTSS)
- d. Intellectual Services Support/Services
 - i. Front End Analysis
 - ii. Training System Requirements Analysis
 - iii. Design Requirements
 - iv. Work-year Support
 - v. Research and Development

CONTRACTORS



NAWCTSD procurement opportunities are advertised in one of several ways dependent upon the method of procurement and the estimated dollar value of the contract action.

- Procurements conducted under any of the Command’s Indefinite Delivery Indefinite Quantity Multiple Award Contracts (aka “MACs”) including Training Systems Contract (TSC) III, Fielded Training Systems Support (FTSS) III, and Training Data Products Contract (TDPC) are advertised on the NAWCTSD Business Opportunities web page located at www.navair.navy.mil/nawctsd/EBusiness/BusOps/Acquisitions/Index.cfm. Industry suppliers that are not prime contract holders to a MAC are encouraged to monitor this site for potential subcontracting opportunities. It is the responsibility of industry suppliers to directly solicit its products and/or services to the MAC prime contractors for potential subcontracting opportunities.
- Unless specifically exempted by regulation, procurement opportunities conducted outside the MAC environment are advertised on Federal Business Opportunities (aka FedBizOpps) at www.fbo.gov/ and Navy Electronic Commerce Online (aka NECO) at www.neco.navy.mil/.
- Limited procurement activity for support services is conducted using the Navy’s SeaPort-e MAC. SeaPort-e information including that related to Rolling Admissions may be found at www.seaport.navy.mil/default.aspx.

The NAWCTSD mission and national security require the innovation, agility, efficiency, and value that small businesses bring to the Warfighter. The Command’s policy is to use small business concerns to the maximum extent practicable. To this end and to the extent consistent with efficient and effective contract performance, NAWCTSD will assist small business concerns, Veteran Owned Small Business (VOSB) concerns, Service Disabled Veteran Owned Small Business (SDVOSB) concerns, Historically Underutilized Business Zone (HUBZone) Small Business concerns, Small Disadvantaged Business (SDB) concerns, and Woman Owned Small Business (WOSB) concerns in obtaining a fair proportion of the Command’s total acquisition dollars through prime and subcontracting. NAWCTSD will aid, assist, and counsel these concerns to the fullest extent consistent with the national interest and procurement guidelines. In furtherance of this initiative and as directed by higher authority, the NAWCTSD Commanding Officer has appointed a Deputy for Small Business who leads the Command’s Office of Small Business Programs. The Deputy for Small Business acts directly for and on behalf of the NAWCTSD Commanding Officer regarding matters related to small business and is responsible for ensuring the Small Business Program is active to include, but not limited to, supporting industry small business partners through outreach events, mentoring, and training on small business initiatives. The Deputy for Small Business contact information is as follows:

Deputy for Small Business
E-mail: ORLO_NAWCTSD_Small_Business_US@navy.mil
Phone: (407) 380-4121

For further information on doing business with NAWCTSD, please contact our Business Support Team by telephone at (407) 380-4763, by e-mail at ORLO_BusinessSupportTeam@navy.mil.

EMPLOYMENT WITH NAWCTSD



◆ **USAJOBS:** <http://www.usajobs.gov/>

The official jobs web site of the U.S. Government is USAJOBS (www.usajobs.gov). USAJOBS provides Federal job listings for all agencies. USAJOBS Resume Builder allows for more than one resume to be maintained and has robust search and notification features. You can set search and notification criteria for NAWCTSD employment opportunities and be notified when job announcements are posted. For additional information about student jobs, veteran's information and current job openings at NAWCTSD see our Employment Opportunities page on our web site.

◆ **Employment Opportunities NAWCTSD:**

www.navair.navy.mil/nawctsd/aboutus/empops/index.cfm

Military personnel should coordinate with their respective detailers regarding future billets that are scheduled for availability. NAWCTSD maintains a select cadre of Fleet experienced Sailors whose subject matter expertise is critical to acquisition of training solutions. The wardroom is comprised of several warfare designators and specialties such as Aerospace Engineering Duty Officers, Acquisition Corps members, Supply Corps, Limited Duty Officers, Aerospace Maintenance Duty Officers, and Medical Services Corps. Most Chief Petty Officers (E-7/8/9) billets exist to provide the vital knowledge and experience that represents the needs of Fleet Sailors. Prior formal acquisition training as mandated by the Defense Acquisition Workforce Improvement Act (DAWIA) is desired; however, it may be completed after reporting aboard.



PHONE DIRECTORY



COMMAND SECTION

PROGRAM MANAGEMENT GROUP

CONTRACTS GROUP, TRAINING SYSTEMS CONTRACTS DIVISION

RESEARCH & ENGINEERING GROUP, HUMAN SYSTEMS DEPARTMENT

LOGISTICS & INDUSTRIAL OPS GROUP

CORPORATE OPERATIONS GROUP

To use this directory, insert one of the following prefixes before the extensions.
(Example: to get information desk from commercial network dial (407) 380-4000)
Commercial: (407) 380-[extension]
Defense Switch Network (DSN): 960-[extension]

Commanding Officer, Executive Officer8128
Technical Director, Deputy Technical Director8129
Acquisition Support Group.....4763
Business Support Team4903

Aviation Programs Directorate.....4595
Surface and Expeditionary Warfare Programs Directorate.....4029
Undersea Programs Directorate4160
Cross Warfare Programs Directorate8085
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Training Systems Contracts Division.....4083
Associate Director for Training Systems Contracts Division.....8037
Deputy for Small Business.....4121

Director Research and Engineering Department
Associate Director, AIR 4.6 Human Systems Department8371
Science and Technology Office8218

Director, Logistics and Industrial Ops Group.....4900
Deputy Director Logistics and Industrial Ops Group.....4961

Security Department8249
Public Affairs Department4870

I/ITSEC



THE INTERSERVICE/INDUSTRY TRAINING, SIMULATION, AND EDUCATION CONFERENCE (I/ITSEC)

The Interservice/Industry Training, Simulation, and Education Conference (I/ITSEC) promotes cooperation among the Armed Services, industry, academia and other national and international organizations in pursuit of improved training and education programs, identification of common training issues, and development of multiservice programs.

NAWCTSD was a charter participant in the first such conference when it was initiated in 1966 as the Naval Training Device Center/Industry Conference. The conference has evolved and expanded to include the Army, Air Force, Marine Corps, Coast Guard, and other Federal agencies.

Each year, engineers from NAWCTSD demonstrate a wide variety of advanced training solutions for aviation, surface, undersea, land, and specialized requirements. NAWCTSD Business Support personnel are also on hand to discuss business opportunities with members of industry.

The conference is normally held each year at the Orange County Convention Center on International Drive in Orlando, Florida.

Our I/ITSEC booth is always centrally located on the conference exhibition floor. We would welcome the opportunity to meet you.

